THE WELL-SPRING OF SCIENCES,

TEACHING

The perfect Work and Practice of ARITHMETICK, both in Numbers and Fractions.

Set forth by

HUMPHREY BAKER LONDONER.

And now again Perused, Augmented, and Amended in all the three Parts, by the said AUTHOUR.

Whereunto are added certain Tables of the agreement of Measures & Weights of divers places in EUROPE, the one with the other, as by the TABLE appeareth.

LONDON,
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To the Right Worshipful the Governours, Assistants, and the rest of the Company of *Merchants adventurers*,

Humphrey Baker *Londoner, wisheth health, with continual increase of commodity by their worthy travail.*

IF the knowledge of Arithmetick, Right worshipful, were of so small profit in the life of man, or so little used in our worldly affairs, that it might be well left, or but seldom frequented, it were well done by the Professors thereof, to pen very long and eloquent Orations, in setting forth the commendation of the same. But since experience hath taught to be true, the old Proverb: *That where good Wine is to sell, there need no Garland be hanged out*: Me thinketh they do great injury unto Arithmetick, that seek to hear the commodities thereof set forth in a short Epistle, and surely they overcharge me in laying such a burthen on my back, as were too importable for the greatest Orator. For the skill hereof is well known, immediately to have flowed from the wisdome of God, into the heart of man, whom he hath created the chief Image and instrument of his praise and glory, revealing himself unto him so far as he judged convenient, whom notwithstanding he could not conceive to remain in the most secret mystery of Trinity in Unity, were it not by the benefit of most divine skill in numbers, which skil also the most full and effectual knowledge of all other things unspeakable, God used in his wonderful Creation of all the world out of nothing, which he accomplished within the compass of certain number

days, expressing moreover, what he made in every day, and of certain his creatures how many he made, as appeareth in the Book of *Genesis*, written by special Revelation of the Holy Ghost, wherein the divine Majesty of God could not be known unto us without the knowledge of numbers, nor *Moses* have understood what himself had written. And *Solomon* the wisest man that ever was, considering the very depth of all things within his mind, to whom God had given a greater gift of wisdome, than to any man either before or since, doubted not to break forth into these words, saying: Thou O Lord hast disposed all things in measure, number, and weight, for thus it pleased him to judge, who in another place testifieth, how that he hath searched deeper into the causes and knowledge of all things, than any other man in the world.

These testimonies (Right Worshipful) do manifestly teach us, what we ought to think of the cause, and original of Arithmetick, and partly also how necessary it is in the life of man, that unless by nature, we have some feeling and understanding therein, we are no better than Beasts, and in this respect worse; for that we attain not unto that whereunto we are as specially born, as naturally they do, some to running, some to smelling, some to hearing, some to flying, and some to swimming. Take away Arithmetick, wherein differeth the Shepherd from the Sheep, or the Horsekeeper from the Asse? Surely but only in shape and figure, which as the Learned affirm, is a very slender cause of difference. Wherefore not without just cause have the ancient Fathers, and Philosophers, singularly extolled the knowledge of Arithmetick, diligently training up their youth therein, as in a science most necessary of it self, considering the deep devices, the profound practices, and cunning conclusions therein

contained: and also that it is the Key and entrance into all other Arts & Learning: as well approved the Noble Philosopher *Pythagoras*, who caused this Inscription to be written upon his School-door (where hee taught Philosophy) in great Letters, NEMO *ARITHMETICÆ* IGNARUS HIC INGREDIATUR: Let none enter here that is ignorant in Arithmetick: Which saying, as it is proper and peculiar unto all sorts of men in the beginning and entrance into all liberal knowledge and Faculties to be ensued and imbraced, so surely above all other, it is next after the Word of God, most fit and necessary that it should be written upon your School-doors, (Right Worshipful) whose Trade and Travail is imployed in the Noble Traffique of Merchandise, wherein you have need of continual recourse up to this excellent Art. The daily exercise whereof, hath so sharpened your judgements, and ripened your understandings, that most of you are become singular therein, both to deal that way your selves, and to judge of other mens doings. And herein I am sure you are good Witnesses with me how foolish and vain is their opinion, which beside your most commendable affairs, suppose and affirm that Arithmetick is of small use unto any other men, seeing that the Laws of sundry Realms well instituted and guided, have deservedly accompted for Fools, and unfit members, (to Rule or deal in a Commonwealth) all such as wanted the skill of natural Arithmetick, deprived them both of Lands and living: which as it tendeth to no small praise and credit of Arithmetick, so am I constrained for brevity sake in few words to overpasse both that and others which might be said in commendation thereof. Shortly admonishing your Worships, that whereas in times past, as is well known, I had travailed in a Book in English of that Faculty de-

dedicated unto you; being now enforced to run over the same, both amending and augmenting it with sundry Additions: I am so bold again to attempt your Worships with the acceptation thereof: hoping that as in foretime ye have taken it such as it was, ye will now also deign to receive it, being in better case (I hope) than ever it was, a token of my good wil, howbeit a simple thing, wherein you may weigh the heart, and not the gift, proceeding from such a Fountain, that if better skill and knowledge had been matched to my good meaning, it should have bin done otherwise to the better contentation of your worthiness. And therefore in the mean season, untill it please God to furnish me in such sort, I rest in daily prayer unto him, to maintain your Fellowship in happy estate, and to bless your purposes with lucky successe, to guide your voyages with wished increase, and to season your doings with all kind of virtue, and to preserve your lives with desired health, to his will and pleasure.

To

To the Reader.

Having (gentle Reader) published in print one Eng-
lish book of Arithmetick, containing as I suppose
sundry profitable documents, for such as desire any know-
ledge therein, I have been often since that time, and of ve-
ry late also, requested by sundry of my friends, to peruse th
same work, and as I should now judge it expedient, to a
something more thereunto, and to amplify the same. Whic
earnest and friendly suite of theirs, for certain just cause
seeming needful unto me, surely I could in no wise den
For when I perceived the importunity of certain Stran-
gers, not born within this Land, at this present, and
late days, so farre proceeding, that they advanced an
extolled themselves in open talke and writings, that the
had attained such knowledge and perfection in Arithme-
tick as no English-man the like; Truly me thought that th
same report, not only tended to the dispraise of our Coun-
try-men in general, but touched especially some others, an
me, that had travailed and written publickly in the sam
faculty. For unto this same effect, they have of late painte
the corners and posts in every place within this City with
their peevish Bills, making promise and bearing men in
hand, that they could teach the summe of that Science in
brief Method, and compendious Rules, such as before
their arrival, have not been taught within this Realm.
Whose sayings to be false, and writings untrue, if I were
thereto required by men of Authority, I am well able to
prove; and that more is, (be it spoken without envy, o
thirst of praise) even within this same Book, if it may
please thee to make tryal, are general Precepts and Rules
to be found, such as they can bring forth neither briefer
nor better. But this is no rare thing, since in other matters
of greater importance, their attempts are too too perilous
and their deeds outragious, well deserving restraint and
banishment, against one of whom, verily not of mine own
accord, but constrainedly, I have been enforced to sharpen
my

my pen, for that he, as I hear say, continueth in dispraise of our Nation, saying: That we are unskilful in those Rules that he teacheth, and himself excellent in the knowledge of Arithmetick: wherein if true trial might be in different Judge, I doubt not but he would be found to have least skill of a great many, of whom perhaps, if I should write upon report of others, I could say somewhat more, which would (if it were true, and be known) redound unto his utter discredit, which for this cause I omit to do, lest the crime of arrogancy might be thought to rest within me, which I object against him; howbeit thus much I dare affirm, that there are divers in this honourable City, who although they advance and extoll not themselves (so malepertly) as these sort of men are accustomed to do in all that they profesſe, yet do far surpass them, as well in the knowledge of numbers as in all other kind of learning and skilfulneſs. Another cause also there is of this present Edition, as it seemeth to me very just and necessary, for when a certain Wel-willer of mine purposing to imploy some time in bettering his knowledge in Arithmetick, through the reading of this present Book, did certify me, that he in perusing the same had espied so many errors committed in the printing, that he could gather no truth thereby: I was not a little moved thereat, since that by the disordering thereof, neither the work retained his true meaning, neither could the Learner attain his desired knowledge: and surely no marvel, for I am credibly informed since it passed out of my hands, it hath been oftentimes printed without the view of a skilful Corrector, unto the great discredit of the Author. These & such like considerations urging me forward, and not forgetting the fruit, loving Reader, that may grow unto thee hereby: I have taken in hand both to amend and augment the same, seasoning (as it were afresh) all three parts of the work with divers Questions and Examples, very

neceſſary and profitable; having alſo for thy commodity added unto the end of the Book divers and ſundry Tables of the agreement of Meaſures and weights of ſundry places, reduced to an equality the one to the other. Unto thee therefore my requeſt is, thankfully to accept the ſame, and in good part, wiſhing well to him that travaileth for thy benefit, not diſdaining it in reſpect of groſneſs of the ſtile, or rudeneſs of utterance, ſince that this Science requireth not eloquence of writing, but plainneſs of teaching, and truth in working of divers concluſions by numbers only, deſiring thee, if thou bee willing to profit hereby, firſt friendly to amend the faults that have eſcaped in the printing of the ſame, and then to begin at the entrance of the Book, and ſo orderly proceeding forward unto the end, not turning unto the midſt or laſt part thereof, untill thou perceiveſt well that which went before; and ſo doing, thou ſhalt not only attain to the perfect knowledge of the whole effect, but be able alſo by thy own labour and induſtry to underſtand all other doubts of Arithmetick, whatſoever: and thus I bid thee well heartily.

THE

THE DEFINITION OF Number.

NUMBER, is as much as to say, a multitude, composed of many unities, as two is composed of two unities, three is composed of three unities, four of four unities, five of five unities, ten of ten, fourteen of fourteen, fifteen of fifteen, twenty of twenty unities, &c.

And therefore an unity is no number, but the beginning and original of number, as if you do multiply or divide an unity by it self, it is resolved into it self without any increase: but it is no number otherwise; for there can be no number how great soever it be, but that it may continually be increased, by adding evermore one unity unto the same.

CHAP. I.

Numeration.

NUMERATION is the ar
whereby to expresse & declare
& value of any Sum propo-
sed, and is of two kinds: th
one gathereth the value of
Sum proposed, and the other expresseth
any sum conceived, by due figures and pl
ces; for the value is one thing, and the
figures are another thing: and that comme
partly by the diversity of figures, but chie
ly of the places wherein they be orderly se
And therefore you must first mark, th
there are but ten figures or characters
are used in Arithmetick, whereof nine
them are called Signifying figures, and th
tenth is called a Cipher, which is made li
an O, and of it self signifyeth nothing, bu
if it be joined with any of the other figure
it increaseth their value, and these be the

1	2	3	4	5	6
one	two	three	four	five	six
7	8	9	0		
seven	eight	nine	a Cipher.		

Also you shall understand, that every o

f these figures hath two values: One is lway certain, and hath his signification f his own form, and the other is uncer- ain, which he taketh of his place.

A place is called a seat or room that a fi- ure standeth in, and how many figures aever are written in one Sum, so many laces hath the value thereof: and that is alled the first place (which is next toward he right hand) of any Sum, and so reckō- ing by order towards the left hand, so that hat place is last, which is next the left and. And contrarywise, when you expres he value of the figures in any Sum, you ust begin at the left hand, and so reckon owards the right hand.

Every of these nine figures (which are alled signifying figures) hath his own mple value when he is found alone, or in he first place of any Sum. In the second lace toward the left hand, he betokeneth is own value ten times: as 70. is seven mes ten, that is to say, seventy, 80. is 8 mes 10. that is to say, eighty. In the third lace every figure betokeneth his own va- e a hundred times: as 700. in that third ce betokeneth an hundred times 7. that

is to say, 7 hundred. In the fourth place every figure betokeneth his own value thousand times: as 7000, is seven thousand, and 8000, is eight thousand: these four first places must be had perfectly in mind, yea, and that by heart as they say, for by the knowledge of them you may express all kind of numbers, how great so ever they be.

In the fift place, every figure betokeneth his own value ten thousand times: as 70000, is ten times seven thousand, that is to say, seventy thousand. In the sixt place, every figure standeth for his own value, a hundred M, times: as 700000, seven hundred thousand. The seventh place, M, M, times, or a Million: as 7000000, is seven M, M, or seven millions, and the eight place, ten M, M, times, or ten millions, so that every place toward the left hand, exceedeth the former ten times. But now for the easie reading, and speedy expressing orderly of any sum proposed, you shall practice this manner following: as for example, I propose this number 76543258, In the which are IX. places. In the first place is 8, and betokeneth

eight, that is to say, once his own value: and the second place is 5, and betokeneth ten times five, that is fifty: in the third place is 6, & betokeneth an hundred times it, that is 6 C. In the fourth place is 2, and that is two M, and 3 in the 5 place, is ten M, times 3, that is 30 M. So 4 in the first place, is C thousand times 4, that is four C, M, then 5 in the seventh place, is a M, M, times 5, that is five M, M, or rather 5 Millions: and 6 in the eighth place, is 6 times ten Millions that is, LX, millions, and last of all 7 in the IX, place is bii C, millions, now followeth the practice. First, put a pick ober the fourth figure, & so ober the tenth, and also ober the 13, 16, or 19, if you habe so many, and so till leabing two figures betwéen ebery pick, and these rooms from one pick to another, are called Ternaries; then you must pronounce ebery thée figures from one pick to another, as though they were written alone from the rest: & at the end of their value, adde so many times a thousand as your number hath picks (that is to say) if there bee but 1 pick, it is but 1 M, 2 picks, 1 M, M, or else a million: if 3

pricks, one M, M, M. or a M, millions and so consequently of all other figures following: then come likewise to the next 3 gures, & sound them as if they were apa from the rest, and adde to their value many times thousands, as there are prick between them and the first place of yo whole number; and so do by the next 3 gures following, and all the rest likewi as in example, 4 5 1 2 3 4 6 7 8 5 6 The first prick is over 8, in the fou place, which is the place of a M. The cond prick is over 4, in the seventh pla which is the place of a M, M, or one m lion: the third prick is over the 10 pla which is the place of a M, M, M, or of a millions, as in the former example. N for the expressing of this number by the lue of every figure, according to the pl wherein they stand, you shall first be at the last prick over 1, and take it, and other two figures 5, and 4, which are hind the said 1, towards your left ha and value them alone, and they are C li. M, M, M, or else CCC Cli. M, lions: then take the other three Figu from 1, to the next prick toward your l

ha

hand, and value them as if they were a part from the other, and they are 234, which do signify CCxxxiiij millions, or 234 M, M. Then come to the third prick over 8, and take the other two figures behind it, & reckon them likewise as if they were alone, and they are six Clxxbiii M. And last of all, come to the other three figures which remain, that is, 567. and they are five Clxbij. thus the whole sum of these figures, is four Cli, m, two CCxxxiiij millions. six Clxxbiij. m, five Clxbij, as before.

Note also, that whole number is divided into three kinds, that is to say, Digit number, Article number, & Mixt or Compound number. The Digit number, is all manner of numbers under ten, which are these nine figures, 1,2,3,4,5,6,7,8,9, of the which I have spoken before. The Article number, is any kind, which hath in the first place a Cipher, as this 0, and they may ever be divided just by ten, without any remain, as these 10, 20, 30, 40, 50, 100, and all other such like. The mixt or Compound number, containeth divers and many Articles, or at the least, one article, and a digit, as 11, 12, 16, 19, 22, 38, 108,

1007, and so forth. And as any Article number may be made a compound, by putting thereto a digit, even so likewise every compound number may be made an article number, by adding thereunto a

Here followeth a brief rehearsal of the Order and Denominators of the places. And this shall be sufficient for Numeration.

The order of the places.	4	3	2	1	0	1	2	3	4	5
	Tenth	Ninth	Eighth	Seventh	Sixt	Fift	Fourth	Third place	Second place	First place
The Denominators of the places.	Quintillions of millions	Quadrillions of millions	Trillions of millions	Billions of millions	Millions of millions	Hundreds of thousands	Tens of thousands	Thousands	Hundreds	Tens	Units

A

CHAP. 2.

Addition in whole Numbers.

ADdition, is as much as to bring together 2 sums or more into one, as if there were due to any man 223 l. by some one body, and 334 l. by another, and 431, by another, & you would know how many pounds are due to the same man in all, these three sums shall you set down orderly, the one under the other, writing the greatest sum highest, and the next to the greatest under it, and the least sum under the last, in such sort that the first figure of the one sum towards your right hand, be directly under the first figure of the other, and the second under the second, and so forth in order.

When you have thus done, draw under them a streight line, and then they will stand thus:

431
334
223

Now beg in always at the first places towards your right hand, and put together the three first figures of the first places of those three summes, and so

took what commeth of them, and wzite that under them beneath the line, as in saying 3.4, and 2 being put together, do make 8: wzite 8 under 2, as here you see.

And then go to the second places of figures, and do likewise: as in saying, 2, 3, & 3 makes 8. wzite 8 under 2. as here you see.

And do likewise with the figures that be in the third place, in saying 2, 3, and 4, are 9, put nine under them, & so will your whole sum appear thus: whereby you may perceibe that those three sums being added together, do make 9881. And this is the art of Addition according to his simplicity, when the sum of any place doth not exceed a digit number. But in case the Sum of any one place cannot be expressed by one figure, but two, you shall put the first of those figures under the line, and keep the other in your mind, for to adde it unto the first figure

of the next place. And if the same next place cannot be abalued but by 2 figures, you must in like manner put the first of those figures under the line, and reserbe the second for the other place next after, and thus must you do from one place to another, untill you habe come to the last place, where if it happen you do find that the sum be of two figures, you must set them both down, because it is the end of that work, as in this example.

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 734682456
 450938341
  13467891
   4672123
 ---------
1203754815
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Where the first figures are, 3, 1, 5, 6, which added together make 15. and for that 15 is of two figures, I do put the first figure 5 under the line, and do keep the second figure (which is 1) in my mind, the which I must adde with the next figures of the second place, that is to say, with 2, 9, 4 and 5, the which together make 21, I write 1 under the line for the second figure

gure of that addition, that is to say, after 5 and I kæp two to be added unto the third place, the which with the other figures 1,8,3, and 4, do make 18, therefore I put 8 next after 1, in the third place under the line, & kæp 1 to be added unto the figures of the fourth place, which is with 2,7,3,2, the which with the 1 that I kæp, do make 14. I set down 4 for the fourth figure (under the line) that is to say between 8, and I kæp 1, to be added unto the figures of the fift place, the which is 7,6,3, and 8 with the 1 that I kæp, maketh 25: I put 5 of the fift place under the line next after 4. and I kæp 2 in my mind to be added with the figures of the first place, that is, with 6,4,9, and 6, and that 2 which I kæp, maketh 27: I write down 7 under the line in the first place, & I kæp 2 which I adde with the figures in ye seventh place, and they make 13, I put down 3 under the line in the seventh place, and adde 1 unto the figures in the eighth place, & they are 10: I do put 0 under the line in the eighth place, and then I adde 1 unto the ninth place, that is to say, with 4 and 7 and they make 12, the 12 I write at length under

under the line, because it is the end of this addition, and this is to be done of all such like. And for the easier understanding of that which wee have spoken of addition, you may examine these two other examples following, in the which the first hath these numbers, 3570, 2763, 579, and 28, which being added together do make this number, 6940, and in the second example, doth result this number, 51683, by adding together of these numbers 47630, 3756, 272, 25, as here under written.

The numbers to bee added.	3570	47630
	2763	3756
	579	272
The line put between.	28	25
The summe of this Addition.	6940	51683

Addition of l. s. d.

But if I have any sums which are compoled of divers kinds of denominations,

as

as 25 l. 17 s. 4 d. and 14 l. 13 s. 8 d. and 16 l. 19 s. 7 d. to be added together. I must first set down all the said sums the one under the other, as here you see: placing the title of pounds, right under the pounds, the shillings under the shillings, and the pence under the pence, keeping likewise the one order of their places, in each denomination: and then begin at the least denomination, which are pence: and I say thus, 4, and 8, makes 12 and 7 make 19 d. that is 1 s. & 7 d. I set down 7 under the line against the place of pence, and I do keep in my minde 1 s. to be added unto the place of shillings: that done, I proceed to the said place of shillings, saying, 1 s. that I keep, and 7 s. are 8 and 3 are 11. and 9 do make 20: I put 0 under the line against 9. and do keep 2 in my minde: comming then unto the tens of shillings, I say 2 that I keep, and 1 make 3, and 1 make 4, and 1 make 5, which are 5 tens of shillings, that is to say, 2 l. and ten ober, the which I put behinde the 0 towards my left hand under the tens of shillings

	li	s	d
	25	17	4
	14	13	8
	16	19	7
	57	10	

ngs, and I do keep two l. in my mind: then I come to the place of pounds, and say 2 l. that I keep, and 5 are 7, and 4 are 11, and 6 do make 17 l. I do set 7 under the line against 6, and do keep 1 in my mind: then comming unto the ten of pounds, I say 1 that I keep, and 2 are 3, and 1 are 4, and 1 do make 5, the which I write down under the line behind the 7: and so is this addition ended, and then the said three sums being added together, do amount to 57 l. 10 s. 7 d. and thus is to be done of all other sums of any other denominations.

Other examples.

225	12	6	5678	13	09
47	3	9	608	00	10
38	18	7	400	17	11
5	00	8	56	18	08
			9	12	07
316	15	6	6754	03	09

Of

CHAP. 3.

Of Substraction in whole Numbers.

SUbstraction, teacheth how you shall substract one lesser number from a greater, and sheweth what there doth remain after that you shall have substracted the same; I speak not of the substracting one equal number, from another equal unto it, for the facility thereof requireth no Rule.

In Substraction are found three numbers: the one is the number from which the Substraction is made. The second the number that is to be substracted; and the third is the number which remaineth after the substraction is ended. As when I would substract 25 from 40. The 40 is the number from which the substraction is made, and 25 is the number to be substracted, and 15 is the number which remaineth after you have ended the substraction: here followeth the practice.

al put the lesser number under the greater, in such sort, that every Figure of the ne number, may answer unto every fi-ure of the other, orderly according to eir places, and then draw a right line nder those two numbers as you did in ad-ition. Then must you begin at the right and, and take the first Figure of the up-ermost number, and substract that from e first Figure of the uppermost number er it, and that which remaineth you ust set underneath the line, right under e figure which you have substracted; then terward take likewise the second figure the nethermost number, and abate that o from the second figure of the higher mber; the third from the third, and so th of all the rest till you come to the end, tting always the remainer of every fi-re under the line in his due order, and ce, as by example: I will substract 2345 om 9876, after that I have set them down according to the man-er aforesaid. Then beginning the first place next to my right nd, I take first 5 from 6, and there re-ste 1; the which 1 I set under the line bt against 5. Secondly, I substract 4

9876	
2345	
7531	

from 7, and there resteth 3: the which 3 I set in the second place under the line next after 1. Thirdly, I subtract 3 from 8, and there resteth 5, the which 5 I put under the line in the third place next after 3. Finally, I subtract 2 from 9, and there resteth 7, the which 7 I put under the line in the fourth and last place next after 5, and thus is this Subtraction ended, and there remaineth 7531.

But when two figures of one liken do chance to meet, so that the one must be subtracted from the other, as if I should subtract 7 from 7, there would remain nothing, then must I set a Cipher under the line. But when the figure which is to be subtracted doth exceed the figure which is ober him, so that it cannot be taken out of the same figure, then must you subtract the undermost figure from 10, and to which doth remain, you shall adde unto the same figure which is upperm And the summe which resulteth of the both, you shall set under the line. Whensoever you do borrow any such 1 ober numbers you must adde 1 to the nethermost figure following which is to be subtracted. And there is nothing

to be done in substraction. Example, I will substract 93576 from 4037479: after that I have placed my two numbers as I ought to do, I first substract 6 from 9, and there resteth 3, then I put the 3 under the line right under the 6. And secondly I substract 7 from 7, and there resteth nothing. I do therefore put a Cipher 0 under the line against 7 in the second place. Then I come to the third place, where I find 5, which I cannot substract from the figure over him, which is but 4, therefore I do substract it from 10, as before I taught, and there resteth 5, the which I do adde with the 4 which is over him, and that maketh 9: I put 9 in the third place under the line for the third figure. Fourthly, for the 10 which I borrowed, I adde 1 unto the next figure which is to be substracted, which is 3, and they make 4: the 4 I do substract from the over figure 7, and there resteth 3, I put 3 under the line for the fourth figure. And then I come to the first place, where I do find 9 which I cannot substract from the figure over him, which is but 3, but I do substract 9 from 10, and there resteth 1,

4037479
93576
3943903

the which figure 1 I do adde with 3, and they make 4: I put 4 under the line for the first figure, and here is to be noted that if it were not for that I did at the last borrow 10, the substraction should have been ended. But for because that I must (for every such 10 that I borrow) always adde 1 unto the next lower figure following, I must therefore proceed unto the substraction: and for because that there is no other figure following in the lower number, it shall suffice to have kept the unity, & to substract it from the next ober figure, but I find there 0, and therefore I cannot substract 1 from 0, therefore I substract it from 10, and there remaineth 9 which I do put under the line in the first place: finally for the ten which I borrowed, I kep 1 in my mind, the which I do abate from 4, and there remaineth 3, the which 3 I do put under the line in the seventh place after 9, and the operation is thus ended.

Another example.

576084025
485675437

90408589

But if there were many numbers

be substracted from one number alone; then must you first adde these numbers together according to the instruction of the Chapter going before, and afterward to make your substraction as above is said. As if I would substract these three sums 123,234,456, from 98925, first, I do adde the three sums in 1, and they are 813. the which I do substract from 98925, and there resteth 98112.

But if the sums be composed of divers kinds of denominations, then you must begin at the least denomination next toward your right hand, and so substract every denomination from his like, if it may be substracted: if it cannot be substracted, then you must borrow 1 of the next denomination toward your left hand, & reduce the same into the like denomination of that figure which is to be substracted, then shall you substract your first or least denomination from the said sum so borrowed, and that figure or number that shall remain, you must adde with the uppermost number of the least denomination, and set the aggregate under the line right against his like. When the 1 which you did borrow, must be added with

the next figure of the next denomination that is to be substracted, and so to proceed with the whole summe that is to be substracted. Example.

I would substract 15 li. 17 s. 11 d. from 28 li 13 s 9 d. I do first put down the greater sum, & under that the lesser, with a line under them, as here you see, and then I do begin at the least denomination, which are pennies, where I say 11 pennies from 9 pennies, I cannot. And therefore I do borrow 1 s. of the next denomination, that is of the 13 s. in the which 1 s. is 12 pennies: Then I substract 11 pennies from 12 pennies, and there remaineth 1 penny the which 1 penny I do adde with 9 pennies and they make 10 pennies: the said 10 I set under the line, and do keep the 1 s. in my mind that I borrowed; then come to the second denomination of shillings where I do find 17 s. then I say 1 s. I borrowed, and 17 do make 18 s. the 18 s. out of 13 s. cannot be, therefore I borrow 1 li. of the next denomination, that is to say, out of the 28 li. and the said

	li	s
	28	13
	15	17
	13	15

re 20 s. then I substract 18 s. from 20 s. I here remaineth 2 s. the which I do ode to the 13 s. and they do make 15. the ame 15 s. I set under the line, and so keep li. to be added to the lower place of ounds, then I say 1 li. that I keep, and are 6: I substract 6 li. from 8 li. and here remains 2. I set the said 2 under he line against 5: and last of all, I come o the tens of pounds, where I do find ne, then I do substract that 1 from 2, and here remaineth one, which I set under the ine, and so I find there remaineth 12 li. 5 s. 10 d. & so is it to be done of all other like.

CHAP. 4.
Of Multiplication.

IN Multiplication there are iii numbers to be noted, that is to say, the number which is to be multiplied, the which we will call the multiplicand: the second is the number by the which we do multiply, which we will name

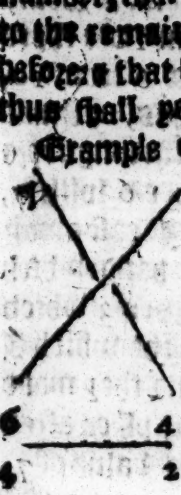
the multiplier, or multiplicator: & the thi
number is that which commeth of the mu
tiplication of the one by the other, which
called the product. As when I would kno
how much amounteth 10 multiplied by
viz. How much are ten times 9, I find th
they are worth 90, then ten is the multipl
cand: & 9 is the multiplier, & 90 is called t
product. So that to multiply is none othe
thing, but to find a number which contain
eth ỳ multiplicand so many times as ỳ mu
tiplier containeth unities: As 10 multiplie
by 9 do make 90 as before it is said. And 9
containeth 10 so many times, as 9 conta
neth unities, that is to say, 9 times. I
Multiplication, it forceth not much whic
of the two numbers be the multiplicand
nor to be the multiplier. For 10 multiplie
by 9, maketh as many as 9 multipled b
10, yet nevertheless it shall be more co
modious that the lesser number be alway
the multiplier. And for that, that the mu
tiplication of figures the one by the othe
is the chief & necessariest kind whereby
know how to work in the multiplicatio
of compound numbers, and that every ma
hath not ỳ same at their fingers end, I wi

therefore give you here certain eaſie ways of multiplication of digit numbers. When you would multiply two ſimple figures, or digits the one by the other, ſubſtract each of thoſe digit numbers from 10. Then multiply the two remains the one by the other, and if the ſum do exceed 10, write only the firſt figure, and keep the other to be added to the next operation, which is thus as followeth: Adde your 2 ſimple figures together, of that which reſulteth of the addition take only the 1 figure, unto the which you muſt adde the unity which you did keep before. And that ſhall be the ſecond figure of the ſum which you do ſeek, exam. I would multiply 7 by 6, I take 7 from 10 there reſteth 3: likewiſe I ſubſtract 6 from 10, there reſteth 4, then I ſay thus, 3 times 4 make 12: I write 2 for my firſt figure, & keep 1 in my mind, then I adde 6 with 7, and they are 13: of the which I caſt away the ſecond figure toward my left hand which is 12, & I take only the firſt figure 3 which is toward my right hand, unto the which I adde the unity which I kept, and they make 4, which I write in the ſecond place after 3, & thus I find 42 which is the value of 7 multiplied by 6.

D-

Otherwise, and all commeth to one effect: set down your two digit numbers, the one right ober the other, and right against ebery of them towards the right hand write his own difference from 10. Then multiply the two differences together, the figure which commeth thereof, shall you set down under both the differences. If it be a digit number, that is to say, any number under 10. But if there be 2 figures, set down but the first, and kéep the other in your mind, afterward substract (from one of the two digit numbers) that were first set down, the difference of the other digit number, that is to say, crosse-wise, and unto the remain, adde the figure which you kept before: that shall be the second number, thus shall you habe your multiplication.

Example of the same figures, that is to say, of 7 multiplied by 6.



the difference of 7 from 10, is 3: and the difference of 6 from 10, is 4: I set them down crosse-wise as you see: And then I say 3 times four are 12. I set down 2, & kéep 1 in my mind

hen I substract 4 from 7, or else three from
it forceth not from which of them, and
here resteth always 3: unto the which I
dde the unity which I keep in my mind,
nd they are 4, which shall be the second
igure of the multiplication. And thus I
ind that 7 multiplied by 6, maketh 42: as
n the other operation. This practice hath
no place where the 2 digit numbers (do
not exceed 10) by adding them together,
and then is multiplication easie enough
without any rule.

Another way to know ẏ multiplication
of simple numbers, is by this table follow-
ing: the use thereof is thus.

First, you shall understand that the
numbers from 1. and so descending down-
wards to 9, which are set in the left part
or hanging margine of this Table, do be-
token the multipliers of all simple num-
bers. And the elements or figures being
put highest in every square room drawing
toward your right hand, right against e-
very of the multipliers, do signifie the
multiplicands, which do appertain unto
the multipliers of the hanging margine.
And the lower or inferior numbers in eve-
ry

ry square room, do betoken the product that multiplication, which is made in multiplying the upper number ober it, with the figure in the banging margine, answering directly unto the said square, as by example.

The Table of Multiplication by all the Digit Numbers.

1	1	2	3	4	5	6	7	8	9
	1	2	3	4	5	6	7	8	9
2	2	3	4	5	6	7	8	9	
	4	6	8	10	12	14	16	18	
3	3	4	5	6	7	8	9		
	9	12	15	18	21	24	27		
4	4	5	6	7	8	9			
	16	20	24	28	32	36			
5	5	6	7	8	9				
	25	30	35	40	45				
6	6	7	8	9					
	36	42	48	54					
7	7	8	9						
	49	56	63						
8	8	9							
	64	72							
9	9								
	81								

First

First, because 1 doth not multiply, I
set in the upper margine the figures f
1 to 9: both in the higher, and also in
inferiour rows, for 1 in the hanging m
gin, multiplied by 1 the upper numbe
the first square, bringeth but 1. So like
2 being the higher number in the se
square of the upper margin, multiplie
1 in the hanging margin bringeth 2 fo
lower number in the second square o
upper margin: For 1 times 1 maketh
1: and 1 times 2 maketh 2. Then 1 t
3 maketh 3, and 1 times 4 maketh 4.
so continuing toward the right hand,
I come to the figure of 9, which is 1 t
9 maketh 9. Then afterwards I mul
2 of the hanging margin by 2 which
upper number of the square next to
the right hand, and that maketh 4, whi
the product of 2 multiplied by 2, that
set under the 2, for 2 times 2 are 4: a
times 3 maketh 6: then 2 times 4 m
8, and 2 times 5 maketh 10, and so c
nuing unto 2 times 9 which maketh
The like is to be done with the third r
so likewise of all the residue.

Example, I would know what i

product of 9 multiplyed by 8. I seek in the hanging margin the multiplier 8, and amongst the squares directly against 8 drawing toward the right hand, I seek the multiplicand 9 in the higher row, and I find the product right under 9 to be 72: Then 72 is the number which commeth of the multiplication of 9 by 8. And so is to be understood of all the rest of the table; which table must be (of all men) learned by heart, or as they say; without book: which being learned, you shall the better attain to the rest of multiplication.

To come now unto the practice of multiplication; when you would multiply two numbers, the one by the other; you must set them down after the same manner as you did in addition, and in subtraction: that is to say, the first figure of the multiplier, under the first figure of the multiplicand, the second under the second, and the third under the third, if there be so many, and then draw a right line under them, as in the other operations going before. After this, you shall multiply all the figures of the multiplicand by the multiplier, and set down the figures (comming of any such mul-

multiplication) under the line, ebery
their due order and place,

Examp. I would multiply 123, by 3, th
is to say, I would know how much amo
teth 3 times one hundreth twenty a
three, the two numbers being placed in su
order as is before said, you must begin t
wards the right hand, and say thu
123 three times 3 are nine: write dow
3 9 under the line right against 3 f
369 the first figure; secondly, by t
same 3, you must multiply the
cond figure 2, and they do make 6, and
do put 6 after the 9 under the line. Thi
ly, by the same 3 you shall multiply t
last figure 1, and they are but 3 set do
3 after 6 for the third and last figure. A
thus is the work ended, whereby you sh
find that 123 being multiplyed by 3 m
keth 369.

But when it happeneth that of the m
tiplication of one figure by another, t
sum which commeth thereof shall be of t
figures, as it happeneth often, then sh
you write down the first figure, and k
the other figure to be added unto the m
tiplication of the next figure.

Example, 6 men have gained (every one of them) 345 Crowns, I would know how many Crowns they had in all. First, I multiply 6 by 5, they make 30. I write 0 under the line, and for 30 I do keep 3 to be added to the next multiplication.

345	
6	
2070	

Secondly, I say 6 times 4, are 24: unto the which I adde 3, which before I reserved, and they make 27: I write 7 in the second place under the line, & I keep 2 to be added to the next Multiplication. Thirdly, I say 6 times 3, are 18, unto the which I adde the 2 which I keep, and they make 20, the which I write all down, for because that is the last work. And so I finde that 345. being multiplied by 6, do make 2070. But when the multiplier is of many Figures you must multiply all the whole multiplicand by every one of those figures, and write the products every one severly under his own figure.

Example, I would know how many daies are past from the Nativity of Jesus Christ, until the year 1560, full compleat. I must now multiply 1560 by 365 daies, because there are so many daies in one

whole year. The leap years being not re-
koned, which have every one of them 3
days. Therefore first by the fi-
gure 5, I multiply all the higher
figures, saying thus, five times
0 maketh 0: I write 0 under the
line for the first figure, and be-
cause I keep nothing for the next place,
proceed and say, 5 times 6 are 30, I se
under the line for the second figure, and
keep 3 to be added unto the next multipli
tion: thirdly, I say 5 times 5 are 25,
which with the three that I keep are 28
set down 8 for the third figure, and kee
to be added with the next multiplicatio
then comming unto the fourth & last figu
I say 5 times 1 are 5, the which with
that I reserved are 7: I put 7 for the
figure of the first work by the figure
with the which figure I have no mor
do, And therefore I cancell the same
with a little stroke through it, to sign
that I have finished with that figure.
forasmuch that in multiplication there
always as many simple operations as
multiplier containeth figures, there res
yet 2 works to be made, I come ther

15
3
78

the second work which is the figure 6, by the which I must again multiply all the figures of the multiplicand, as I did by 5, and the first figure (which shall be produced) I do put one rank more lower than the figures of the last work now made by 5 not right under the first figure of the multiplyer 5, but under 6: that is to say, one figure or place nearer toward the left hand and one rank more lower than the first work: And I must put afterward every of the other figures in connexion of the same multiplycation in their order: Thirdly, I do make the multiplication by the third figure, that which shall come thereof, I must set in his rank, as hereafter shall appear. And now I need make no further discourse here of, because that he which can do the first multiplication by 5, may as easily do all the others. It shall therefore suffice to set here under the examples of all 3 sundry works.

	1560	1560
1560	65	356
5	7800	9360
7800	9360	7800
	101400	4680
		569400

Now, if you will know how much a the three workings thus placed, do amou unto, which in value must be but one nu ber: you must adde all the numbers whi are come of all the 3 multiplications t gether, but not after the same manner we have done in the Chapter of Additio the first figure of the first rank with t first figure of the second rank, and so of t third: but you must adde them in t same sort, as you shall finde them scit ted and placed: that is to say, the first gure of the first rank alone by it self: t second of the first rank with the first of t second rank: the third of the first ra with the second figure of the second ran and with the first of the third rank, a so of all the other, as hereafter doth appe

And thus the 1560 yeares do contain five hundred sixty and nine thousand four hundred daies, not counting herein the daies of the leap years, which are here in number 390, for then the whole sum daies should be 569790.

15
3
78
936
4680
5694

Anot

Another Example.

34560
2456

207360
172800
138240
69120

84879360

The Summe of Multiplication is thus, when you would multiply any number by 10, you shall onely put one cipher 0 before all the numbers, that is to say, a degree nearer to the right hand, as 345 multiplied by 10, maketh 3460. If you will multiply any number by 100, adde to the same number two ciphers thus, 00, if by 1000, adde 000. And to be briefe, when the last figure of the multiplier is 1, and all the rest be ciphers, adde so many ciphers to your multipilicand, as there shall be found Ciphers in your multiplier. But if in your multiplying, the last figure were not, but that there were only certain ciphers in the beginning: and that the other were signifying figures, and likewise those of the multiplicand, then shall you put those

Ciphers apart, and multiply the signifi-
ing figures of the other. Then adde un-
the product of that multiplication, all t
Ciphers which you did before put apa
As if I would multiply 46000 by 350
I put apart the three Ciphers of the fi
and the two Ciphers of the second nu
bers, which are in all 5 Ciphers 0000
And then I multiply 46 by 35, and the
of commeth 1610: before that which
ward the right hand, I adde the 000
that I did put apart, and then the wh
product will be 161000000.

46
35

230
138

161000000

CHAP. 5.
Of Division,

Division or Partition is, to seek how many times one number doth contain another, or else how often times one number may be found in another, for in the work of Division there are required two numbers to be first known, for the finding out of the third. The first number known, is called the dividend or number which is to be divided, and that must be the greater number. The second number is called the divisor, and that is the lesser. And the third number which I do seek, is called the quotient. As if I would divide 36 by 9, the dividend shall be 36, and the divisor is 9. And for because that 9 is contained in 36, 4 times, that is to say, 4 times 9 do make 36, the quotient shall be 4, as if you mark well, how many times 9 is contained in 36. you shall find it 4 times, and therefore 4 shall be the quotient.

The Practice.

Write down first the dividend in t
higher number, and the divisor underneat
in such sort, that the first Figure of the d
visor toward the left hand, be under t
first Figure of the dividend, and every fi
gure of the same divisor under his like, th
is to say, the first under the first, the secon
under the second, the third under the thir
and so consequently of the other; if there
so many, which is contrary to the oth
three kinds before specified: but yet y
must consider further, if all the lower
gures of the divisor, may be taken out
the higher figures of the dividend by
order of substraction or not. The which
you cannot do, then must you set the fi
figure of the divisor (toward the left hand
under the second figure of the dividen
and so consequently the rest in their due
der; if any be to be set down, every one
them under his like, as before is said. A
then draw a line between the dividend a
the divisor. And at the end of them anoth
crooked line, behinde the which towa
the right hand shall bee set your quotie
As by this example following, whe

be dibisor is but of one figure.

If you would dibide 860 by 4, you must set down 4 under the 8 with a line between them, as here under you may see.

The Dibidend. 860
The Dibisor. 4

And then you must seek how many times the dibisor 4 is contained in the higher number, that is to say in 860, the dibidend answering to him, as in this our example, I must seek how many times 4 is contained in 8, in the which I finde it 2 times, then I write down 2 apart behinde the crooked line, as here you may see, which shall bee the first figure of the quotient to come: secondly, by this figure 2 (being thus put apart) I must multiply the dibisor 4; and under the same multiplication, I must set that number which cometh of the same multiplication; as 2 times 4 do make 8, the which 8 I do set under the dibisor 4. Thirdly, I do substract the product of the said multiplication (of the quotient by the dibisor) that is to say, 8 from the higher number correspondent to the same substracting from 8, there remaineth nothing, & then I can-

860
4 (2
8

cancell or strike out that which is done, you see. In these three operations a works, is comprehended the Art of Div on. The which are to be observed fr point to point, for there is no diversity the signifying of the same, which is th

Now secondly I must remove my bisor one place nearer toward my ri hand, as in precéding with our example. Here you see I re- move my divisor 4 which was under 8, and I set it under 6, then I seek how many times 4 is contained in 6: where I find it but time, then I set 1 behind the crooked next unto the first figure of the quotien a degrée or place nearer my right hand ferward by this last and new figure multiply the divisor 4, and that maketh 4 (for an unity which is but 1, increa nothing) I abate therefore 4 from higher figure 6, and there resteth 2. which 2 I set ober the 6: and I cancel 6, for so must I do when there reste ny thing after I have made the substi on. Thirdly, for as much as there yet maineth another figure in the divisor

2
8 8 (
4

remove again the divisor, and I set it under the Cipher 0. Then I seek how many times 4 is in the higher number, which is twenty, where I may find it five times, I put therefore five behind the crooked line for the third and last figure of the quotient, then by the same 5, I multiply the divisor 4, and that maketh 20, the which 20 I abate from the higher number, and there resteth nothing, And so is the division ended, and thus I have found that 860 being divided by 4, bringeth for the quotient 215: that is to say, that 4 is contained in 860, two hundred and fifteen times. This is the most easiest working that is in division, but that which followeth appertaineth to the whole and perfect understanding of the same. When the first figure of your divisor toward your left hand is greater than the first of the dividend, you must not place the first figure of your divisor right underneath the first of the dividend, but under the second figure of the same dividend, nearer to your right hand, as before is said. Therefore when the divisor is of many figures, and that

```
   2
860  (215
   4
  20
```

you

you habe to ſéek how many times it is co
tained in the higher number (for the m
eaſier working) you muſt not ſéek to eb
the diviſor all at one time, but you muſt
and mark how many times the figure
the ſame toward the left hand is contai
ed in the higher number anſwering to t
ſaid number, and then to work after t
ſame manner as is before taught.

Example, I habe 316215 crowns
be diviſed among 45 men, and for to m
my diviſion, I muſt not put the firſt figu
of the diviſor, which is 4, under the firſt
the Dividend, which is three, becauſe th
4 is a greater number than 3. And furth
you know, that I cannot take 4 out of
wherefore I muſt ſet the 4 under the
cond figure of the higher number, that
to ſay, under 1, and the figure 5 of the
viſor, right under the 6, as here you m
ſée.

So that I muſt firſt ſéek, how many times 45 in contained in 316, which is but

apart of the Dividend. Wherefore for
more eaſie working, I need but to ſeek h
many times 4 is contained in 31. A
bers

ecause I may have it 7 times, I put 7 ehind the crooked line, as is afozesaid; then y 7 I multiply all the diuisor 45 and they re 315: the which I set under the same iuisor the first figure under the first: and he other in ozder towards the left hand. Then I substract 315 from the higher umber 316: and of this first wozking here remaineth but 1, the 1
which I set ober the 6, and 316215 (7
I cancel likewise the 315, 45
and the other figures 316, 315
and also the diuisor 45: and
hen it will stand thus, as in the margent.

And when I come to remobe the diuisor, and that I must seek how many times it is contained in the higher number, if I see that I cannot finde it there; that is to say, that if the higher number be lesser than the diuisor, as it is in this example, then must I put a Cipher in the quotient behinde the crooked line, and if there remain any figures in the dibidend, which are not yet finished, I must remobe the diuisor again nearer toward my right hand by one place, for to finde a new figure in

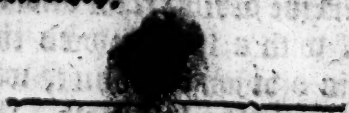
the

the quotient. As in this one example, after that I have removed the divisor seek how many times 4 is contained in 12, and because I cannot have 45 in 12: put a 0 behinde the crooked line after 7: then without multiplying or abateing, I remove again the divisor nearer towards my right hand and I seek how many times 4 (which is the last figure of the divisor) is in the next number, that is to say in 12, whereas I find 3 times: I put 3 behinde the crooked line, for the third figure of the quotient: then by the same figure 3 I multiply the divisor 45, and there commeth 135, And in the number above there is but 121, so that I cannot take out of 121. which is the lesser number. And therefore here is to be noted, that it happen, that the figure being last set which is put in the quotient, do produce a greater number (in multiplying all the divisor by the same) than which is above the said divisor, put

1
345215
45 (70

1
345215
45 (703
135

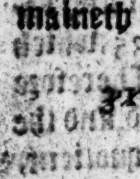
hen make the same figure of your quoti-
nt (which you do put down) lesser by
, and after that you have cancelled the
rst multiplication, you must make a new.
nd the same must be done so oftentimes,
s (in decreasing the same) it may produce
lesser number, or at the least, a number
qual to that which is ober it, as in the
st work, for because that the divisor be-
ng multiplyed by 3, bringeth 135, which
mounteth to more than 121. Therefore
e same product must be cancelled, and the
gure 3 which I did put in the quotient,
ust be also changed into a figure of 2.
Then by the said 2, I must multiply the
ivisor 45, and thereof commeth 90, the
hich I abate from 121, and there re-
maineth 31. And then will the sum stand
us as followeth.



3 1 6 2 1 5
45 2
135 (703
90

And here is also to be noted, that the
mme which remaineth must be always
lesser

letter than the diuisor. Then finally, I
moue the diuisor to the two next figures
wards the right hand, and I seek how
ny times 4 is in 31, and for because I f
it 7 times, I put 7 in the quotient, by w
I multiply the diuisor, and thereof co
315, the which I abate from the di
number of the Diuidend, and there
maineth nothing, as you may see.



But if it happen that after the div
is ended, there do remain any thi
the diuidend, as often times there doth
must also set them that remain apar
vnder the crooked line, after the entire
tient, and the diuisor right under the
remain, with a line between them
As in this diuision following, where t
remaineth 3 in the last work. And
the same doth signifie shall bee taugh
to you when I shall treat of fraction
broken numbers.

i.	ii.
11	11
467859	467859 (10
456 (1	456
iii.	iiii.
2	2
1173	11733
467859	467859 $\frac{1}{456}$
456	456 (1026
912 (102	2736

In summe, all the whole practice of division may be kept in remembrance by three letters, that is to say, S, M, and A, which three letters do signifie, to seek, to multiply, and to abate.

First, I must seek how many times the divisor is contained in the higher number: then by the quotient (which I find) I must multiply the divisor. Finally, I must abate the product of that multiplication from the higher number correspondent to the same, that is to say, out of the dividend, answering to the divisor.

And further, besides this kind of working in Division, the which is regular and commune; I will here put another man-

ner of working very easie; the which sh
serve for such divisions as are more diffi
to be wrought: that is to wit, when
number to be divided is very great, and
divisor great also, and it shall serve ag
for to avoid errour in supputation, and
the placing of fewer figures in the qu
ent: and consequently it shall save m
labour unto them which as yet have
much studied in this Art. The pra
whereof is thus, as followeth.

If you would divide 7894658 by 6
First, you shall understand, that altho
the figure of the divisor toward your
hand, may be found many times in
higher number, as 10 times, 12 tim
more: yet is it so that you must neb
but one figure only at a time in your
tient. And you shall at no time put
number in your quotient which exce
the figure of 9, that is to say, any nu
being greater than 9. And therefo
to come unto your practice, write
your divisor one time, and behind
ward your right hand, draw down
straight, and right against the same di
behind the line toward the right han

this figure 1. Then double your said diuisor, and right against the same which you haue doubled, put behinde the line the figure of 2. This done, you shall adde unto the same number that you doubled, your said diuisor, and right against the same product behinde the line you shall put the figure of 3, and unto this third product you must adde again your diuisor, and right against the same product behind the line, set the figure 4. And thus must you do untill you come unto the figure of 9, in such sort, that every of the products do surmount so much his former number, as all the diuisor doth amount unto: placing at the right side of every product behinde the line, the number which signifieth how much he is in order. That is to say, right against the fifth product, you must put 5, and right against the first product, you must put six: and so likewise of all the other.

The Example followeth in the next page.

Example of the diuisor proposed, 6
First of all I write down 643, and r
against the same beh
643 | 1 the line towards my f
1286 | 2 hand, I put 1. Secon
1929 | 3 I double 643, & they m
2572 | 4 1286, and right ag
3215 | 5 that Summe behinde
3858 | 6 line, I put 2. Thi
4501 | 7 unto that same 1286, I
5144 | 8 the Diuisor 643 and
5787 | 9 are 1929 & right aga
the same I set 3. Fourth
unto the said 1929, I adde the diuisor 6
and they make 2572, and right aga
the same I put 4. And thus must you
alwaps by increasing so much e
product, as the Diuisor doth amount u
until you haue done so nine times, as
see in this present Table.

This being done, you must set d
your diuisor under the dividend 7894
after the same manner as is before or
red: that is to say, 643, under the 3
figures of the dividend toward your r
hand, namely, under 789. Then must
seek how many times 643 are conta

789: And for to know the same, you must look in the aforesaid table if you may there find the same number 789, the which is not there. Therefore you must take a lesser number, the nearest to it in quantity that you can find in the table, the which is 643, which number hath against it on the right hand of the line, this digit 1. Then take the said 1, and put it behinde the crooked line, for the first figure of the quotient.

Then you must abate 643, from 789, and there will remain 146, the same shall you put over the 789, and cancel the 789, and thus is the first work ended. Then set forward the divisor, one figure nearer to your right hand, and seek a new quotient as you sought this, where you finde the figure number over your divisor to be 1464. The which seek in the Table, and because you cannot find it there, you must take a lesser number the nearest to it that you can finde, and that is 1286, which number hath against it this digit 2. therefore you must put 2, for the second figure of the quotient behinde the line, and then abate 1286. from the said 1464, and

there will remain 178. Thirdly remo
forward the diviſor as you did before, a
you ſhall find the higher number ober
to be 1786, ſo that the next leſſer num
to it in your table, is again 1286,
therefore once again 2, in the quoti
for the third figure, and abate the
1286, from 1786, ſo there will rem
500.

Fourthly, ſet forward the diviſor:
the higher number ober it, is 5005,
the next leſſer number to it in your tab
is 4501, right againſt the which is 7,
7 in the quotient for the fourth figure.
after that you habe abated 4501,
5005, there will remain 504. Finall
mobe forwards your diviſor unto the
place, and you ſhall find the higher n
ber ober it to be 5048. And the next l
number to it in your table, is 4501. Th
fore ſet 7 again in the quotient for the
and laſt figure. Then ſubſtract 4501 fr
5048, and there will remain 547: w
muſt be put at the end of the whole qu
ent, with the diviſor under it, and a l
between them in this manner follow

(12277 $\frac{547}{5048}$

The Summe of Division.

When you would divide any number by ten, you must take away the last figure toward your right hand, and the rest shall be the quotient. Example. As if you would divide 46845, by ten, take away the five, and then 4684 shall be the quotient, and the five shall be the number that doth remain. Likewise when you would divide any number by 100, take away the two last figures toward your right hand, and if you would divide by 1000, take away three figures, if by 10000, take away four figures. And so of all other, when the first figures of the divisor toward the left hand shall be only 1, and the rest of the same divisor being but Ciphers.

Here follow the proofs of Additio Subſtraction, Multiplication, and Diviſion.

The proof of Addition.

When you would probe w ther your Addition be made, conſider the figu of the numbers which added, every one in his ple value, not having regard to the place where he ſtande but to reckon him as though he were lone by himſelf, and then reckon them one after another, caſting away fr them the number of 9, as oft as you m And after your diſcourſe made, kee mind the ſame figure, which remai after the nines be taken away, or elſe the ſame in a bold place at the upper of a line. For if your addition be well m the like figure will remain after that y habe taken away all the nines out of t total ſum of the ſame Addition, as ofte times as you may there find any: as in this addition which here you ſee, there remaineth 2, for each part.

	24567
	5339
	481
	30377

The proof of Substraction.

ADde the number which you do substract, unto the number which remaineth after the substraction is made, and if the total sum of that Addition be like unto the number, from the which the substraction was made, you habe done well, other wise not: as in this Example doth appear, where you see the number which is to bee substracted from 5463, is 3584 and the number which doth remain is 1879, the which two sums being added together do make 5463, which is like to the higher number, out of the which the substraction was made, as before is said.

5463	
3584	
1879	
5463	

The proof of Multiplication.

THe proof of Multiplication is made by the help of division. For if you divide the number produced of the multiplication, by the multiplier you shall find the higher number, which is the multiplicand.

The proof of Division.

TO know if your division be well made, you must multiply all the quotient by your divisor, and if any thing do re-

remain after your division is made, t
same you shall adde unto the product wh
commeth of the multiplication, and
shall find the like number unto your d
vidend, if you have well divided: otherwi
not.

CHAP. 6.

Of Progression.

PRogression Arithmetical, is a ha
and speedy assembling or adding toge
ther of divers figures or numbers, eve
one surmounting the other continually b
equal difference, as 1,2,3,4,5,&c. Ha
the difference, from the first to the secon
is but of 1, and so do all the other; eve
one excéd his former figure by 1 still to
end. Likewise, 2,4,6,8,&c. do procéd
the difference of 2. Also 3,6,9,12,&c.
every one differ from other by 3. An
may these numbers continue infinitely a
ter his order, in adding unto the 3 num
ber, the quantity wherein the 2 doth dif
from the 1: Likewise adding the same d
ference unto the 4 number, also to the
and so unto all the other; as 1,4, the dif
rence of the second to the first is three, ad
3 unto 4, and they are 7 for the third nu
be

er. Then adde 3 unto 7, and they make
o for the fourth number, and so all other.
Then if you will adde quickly the num-
ber of any progression, you shall do thus.
First, tell how many numbers there are, &
write their sum down by it self, as in this
example, 2, 5, 8, 11, and 14, where the num-
ber of their places are 5, as you may see.
Therefore you must set down 5 in a
place alone, as I have done here in the
margent. Then shall you adde the first
number and the last together, which in this
example are 14 and 2, and they make 16,
take half thereof which is 8, and multiply
it by the 5 which I noted in the margent
for the number of the places. And the
summe which amounteth of that multipli-
cation, is the just Summe of those figures
added together. As in this example: 8
multiplyed by 5 do make 40, And that is
the total Summe of all the figures. And-
ther example of parcels that are even, as
thus, 1, 2, 3, 4, 5, and 6. So that in this
example you must likewise note down the
number of the places, as before is taught,
and then adde together the last number
and the first. And the Summe which com-

meth of that addition, ſhall you multiply half the number of the places which before are noted, and that which reſulteth the ſame multiplication, is the whole ſum of all thoſe figures, as in this former example, where the number of the places is 6. I note the 6 apart, and then I adde 7 and 1 together, which are the firſt and laſt numbers, and they make 7, the which I multiply by 3, which is half the number of places, and they make 21, and ſo much amounteth all thoſe figures added together.

Queſtion done by Progreſſion Arithmetical.

1 A Merchant hath ſold 100 Kerſies after this manner following, that is to ſay, the firſt peece for 1 s, the ſecond peece for 2 s, and ſo forth, riſing 1 s, in every peece of Kerſey, unto the hundreth peece. The queſtion is to know, how much he ſhall receive for the ſaid 100 peeces of Kerſies? Anſw. It behoveth you to know the addition of the 100 terms, in this progreſſion: And therefore you muſt

s. which is the price of the first piece with 110. which is the price of the last piece, and thereof commeth 101, the same for you must multiply by half the number of places, that is to say, by 50, and thereof commeth 5050s. which being divided by 20. there of will come 252li. 10s.0d. which is 2li, 10s.6d. a piece one with another. Thus the 100 Kersteis are sold by the said Merchant, for 252 li. 10s. 0 d. The practice followeth.

100
1

	1	
101	5050	(252 li 10 s.
50	2220	
505		

Questions of Progression.

I Would lay 100 stones or other things in a right line, and every of the said stones to be a just pace one from another, and one pace from off the first stone there standeth a basket, I demand how many paces a man shall go in gathering up the said stones, and bearing them unto the basket one stone after another? Answer,

First,

First, when he fetcheth the first stone putteth it into the Basket, he mak paces, for the second 4 paces, for the 6 paces, for the 4th 8, & so forth unto last stone: wherefore the last term be 200, unto the which you must add first terme which is 2, and they make wherefore the half is 101, the which shall multiply by 100, which is the n berof the termes in your progression else multiply 202 by 50, which is hal number of paces, and thereof will 10100 paces, and so many paces shall b in all.

Questions of Progression Arithmetical.

1 THere is a messenger which goeth every day 8 miles, another man f loweth him incontinently, and he g the first day 1 mile, the second day 2 m the third day 3 miles, and so increa his journey, every day one mile by m ral Progression. The question is to k in how many days the second man h have overtaken the first: Answer,

ust consider that 8 is the middle or half well of the termes, as of the number of e days: And therefore double 8, and ereof commeth 16: substract 1, and there ill remain 15: and in so many days hall he have overtaken the first messenger. The proof thereof is very easie, If he second had gone the first day 2 miles, he second 4 miles, the third day 6 miles, nd so increasing every day his journey by , in how many days should he have overaken the first man? for to do this you ust perceive that 4 is the middle and ourth terme. There fore double 4 and they make 8, from the which substract 1, and there remaineth 7, and in so many days he hould have overtaken him.

Questions of Progression Arithmetical.

There is one man departeth from London to Chester, and so to Carnarvan, the distance being about 200 miles: he goeth the 1 day 1 mile, the second day 2 miles, the third day 3, and so orderly by natural Progression; Another man departeth at the same instant from Carnarvan

narvan to London, and goeth the first 2 miles, the second day 4 miles, the third day 6 miles; and so increasing every 2 miles. The Question is, to know how many days these two persons will meet together? Answer. First, you must consider, that he which goeth by Progression natural, maketh but half the way the other doth, so that he shall have made the one 3 part of the way at their meeting together. Take therefore the $\frac{2}{3}$ part of 100, & you shall have $66\frac{2}{3}$. Then you must seek 2 numbers, whereof the greater of them, may be double unto the other 1: and that the 1 of them being multiplied by the other, the product of them may be $66\frac{2}{3}$ or little more, so that the more do not exceed the value of the greater term. Here in this question, the 2 nearest numbers are 12, and $6\frac{1}{12}$ which multiplied the one by the other, do make 78, which is $11\frac{1}{3}$ more than $66\frac{2}{3}$ wherefore that when they should meet together, he had gone but $\frac{1}{3}$ of a mile of his fourth which was upon the 12 day: then if you will know what part of the day that he did meet you must divide $\frac{1}{3}$ by 12, and

shall find $1\frac{1}{2}$ of a day. Therefore in 11 daies and $\frac{1}{12}$ part of a day, that is upon the $11\frac{1}{2}$ day, they shall meet together.

If a man do owe unto mee a 1000 Crowns to bee paid in 20 daies, by terms by Arithmetical progression: The question is, to know with what number he shall begin and continue his progression. Now. To do this you must adde 1 unto 20, and they make 21, the which you shall multiply by 10, which is half the number of the places, and thereof commeth 210, therefore divide 1000 by 210, and thereof will come $4\frac{16}{21}$, the patment of the first day, and by this number doth the said progression encrease in this sort following: $4\frac{16}{21}$ $9\frac{11}{21}$ 14 $\frac{6}{21}$ $19\frac{1}{21}$ &c. And so of others.

A man oweth mee 400 li. to be paid in 40 yeers by Progression Arithmetical; that is to say, 40 li. at the end of the first year, and every year following 10 li. to the end of 40 yeers: hee offereth to pay me the said 400 li. all at one patment. The question is to know, at what time he ought to pay me the same at one patment, that I

be not interested in the time? Answ. [illegible]
1 unto the number of the terms which [illegible]
10, and they make 11, wherefore you [illegible]
take the half, that is to say $5\frac{1}{2}$: Therefore he must pay his at 5 years and $\frac{1}{2}$ the said 400 li. all at one time; for that which he payeth before, is equal to that which remaineth unpayed. This rule hath place when the payments are equal. But if it happen that the last payment be less than the others, you must in this case take the last payment other one of the others, and to make thereof a fraction: the which must be added unto the number of the terms, and the half of the said sum being taken, shall shew the time that the said payment ought to be paid at once. As if the party did owe me put 280 pounds, to be paid every year 40 li. it is certain that he must hold 10 years to end the payment. And it is true, that upon the 10 years there would remain but 20 li. to be paid. Therefore put 20 over 40 in this sort, $\frac{20}{40}$, that maketh $\frac{1}{2}$, the which you shall add unto the number of terms, and you shall have $11\frac{1}{2}$, whereof the half which is $5\frac{1}{4}$ shew you that he must pay the said 280 li.

years ½ all at one payment, and so of all such like.

Progression Geometrical, is, when the second number containeth the first in any proportion, as 2, 3, or 4 times, and so forth. And in like proportion shall the third number contain the second, and the fourth number contain the third, and the fifth the fourth. As 2, 4, 8, 16, 32, 64, here the proportion is double.

Likewise, 3, 9, 27, 81, and 243, are in triple proportion.

And 2, 8, 32, 128, and 512, are in proportion quadruple.

That is to say, in the first example, where the proportion is double, every number containeth the other 2 times, as 4 containeth 2, two times: 8 containeth 4 two times, &c. In the second example of triple proportion, the numbers exceed each other three times. And in the third example, the numbers exceed each other four times, & thus you see that Progression Arithmetical, differeth from Progression Geometrical, for that in Progression Arithmetical, the excesse is only in quantity, but in Progression Geometrical, the excesse is in proportion,

Now if you will eafily find the Summ of any ſuch numbers, you ſhall do thus conſider by what number they be multiply ed, whether they be multiplyed by 2, 3 4, 5 or by any other: & by the ſame number, y muſt multiply the laſt ſum in the progreſſi on. And from y product of the ſame multipli cation, you ſhall abate the 1 number of the progreſſion, and that which remaineth of the ſaid multiplycation, you ſhall divide by 1 leſſe than was the number by the which you did multiply, and the quotient ſhall ſhew you the ſum of all the numbers in a ny progreſſion. As in this example, 5, 15, 45, 135, and 405: which are in triple pro poztion. Now multiply 405, which is the laſt number, by 3: becauſe they are in triple propoztion: and they are 1215, from which you ſhall abate the 1 number of the progreſſion, which is 5, and there remaineth 1210: the which you ſhall divide by a number leſſe by 1 than that which was, by the which you did multiply, that is to ſay by 2, & you ſhall find in the quotient 605 which is the total ſum of the numbers of that progreſſion. Likewiſe 4, 16, 64, 256, & 1024, which are the propoztion quad

ple: therefore you shall multiply 1024, by 4, & there will come 4096, from the which abate the 1 number 4, & there will remain 4092: The which you must dibide by 3, & you shall find in your quotient 1364: which is the total sum of that progression, and this shall be sufficient for Progression.

A Question of Progression Geometrical.

A Merchant hath sold 15 yards of Satten, the first yard for 1 s. the second 2 s. the third 4 s. the fourth 8 s. and so increasing by double progression Geometrical. The question is to know how much the said Merchant shall receibe for the said 15 yards of Satten: Answ. First, it is needfull to know, how much the whole numbers of the said progression do amount unto together. And for to do it, you must find the last term, therefore you must set down the said Progression unto the 8 term, which is 128: the which you shall multiply by it self, and thereof commeth the fifteenth term, that is to say, 16384, the same shall you multiply by 2, for because the Progression is ouble, and thereof will

come 32768 from the which you must
draw the first term, which is 1. And
rest being 32767, is the just Sum of
15 terms: and consequently the 15
of Batten shall be worth 32767 shillin
the which are 1638 li. 7 s.

CHAP. 7.

Of the Rule of Three, called the Gol
Rule; of the rule of four proportion

The Rule of Three, is the chief,
profitable, and the most excellent
of all the Rules of Arithmetick. A
other rules have need of it, and it p
all other, for the which cause it is call
the Philosopher did name it the G
Rule. And after others opinions
ment, it is called the Rule of Propo
of 4 numbers. But now in these
days, by us it is called, The Ru
Three, because it requireth three num
in his operation. Of the which
numbers, the two first are set in a ce
proportion, and in such proportion as
be established, this Rule teacheth

out unto the 3 number, the 4 number to him proportioned, in such sort as the 2 is proportioned unto the first. Not for that, that the four numbers, nor yet the three are to be proportional, or set in one proportion, but such proportion as is from the first to the second, ought to be from the third unto the fourth, that is to say, if the 2 number do contain the 1 two times or more, so many times shall the fourth number contain the third. And note well, that the first number and the third, in every rule of three, ought and must be always of like denomination, and of one condition and nature, and the second number, and the 4, must likewise be of one semblance and likeness, and are dissemblant, and contrary to the other 2 numbers: that is to say, to the first, and the third. And if you do multiply the first number by the fourth, and the second number by the 3, the product of your two multiplications will be equal. Likewise if you divide the one semblant by the other, that is to say, the third number, by the first, and likewise the one dissemblant by the other, that is to say, the fourth number by the second (which are dissem-

blant to the other two numbers) your two quotients will also be equal.

The stile and manner of this rule, thus; you must set down your three numbers in a certain order, as by example following shall appear. And then you shall multiply the third number by the second, and the product or number that commeth of the same multiplication, you must divide by the first number: or otherwise divide the first number by the second, & the quotient thereof shall be your divisor unto the third number, that is to say, the third number shall be divided by the quotient of the foresaid division, that is, by the quotient of the first number divided by the second. Or otherwise divide the second number by the 1, and that number which commeth in your quotient, you shall multiply by the third number. And thus shall you have the fourth number which you seek for. And thus is your fourth number in such proportion unto the third, as your second number is unto the first.

Example.

If 8 be worth 12, what are 14 after the rate? or else if 8 require

for his proportional, what will 14 de-
mand? The which three numbers may
conveniently be set in such order as hereaf-
ter doth appear. If 8 make 12, what will
14 make? You must multiply the third
number 14, by the second which is 12, and
thereof commeth 168 for the whole pro-
duct of this multiplication: the which (as
the rule teacheth) you must divide by the
first number, that is to say, by 8, and there-
of commeth 21, and so much are the 14
worth. This is the way which is most used.

8.	12.	14

14
12
28
14
168

168 (21
88

Otherwise divide 8 by 12, which
you cannot do; for they are $\frac{8}{12}$,
therefore abbreviate $\frac{8}{12}$, and they are
for your Quotient, then divide the
third number 14 by the said $\frac{2}{3}$, multi-
plying 14 by 3, which maketh 42,
which 42 by 2, and you shall have 21
for your Quotient. Or else divide the second num-
ber 12, by the first number 8, and thereof

com-

commeth 1 ½, the which 1 ½ you shall
tiply by the third number 14, and t
will come 21, as is abode laid, and
must you do of all other: and alth
that the numbers of this rule may be t
in three differences, for sometimes
are whole numbers and broken toget
sometimes broken numbers and brok
gether, and sometimes all whole num
if they be whole numbers, you mu
none other wise than you did in the la
ample. But in case they be broken n
bers, or broken and whole numbers to
ther, the manner and way to do them,
quireth a certain variation and difficu
according to the variety of the numb
that shall be proposed: the which oper
on easily to do, and unvariable, this R
seacheth.

The three numbers being set down
cording unto the order of the whole n
bers aforesaid, without any broken n
ber, let ½ be put always underneath
whole number, with a line between t
fraction wise, as thus ½, and that 1 t
nominator to every such whole num
But when you have whole number

ken together, they must be reduced, and added with their broken number, and if there be broken number without any whole number, the same broken must remain in their state.

The Rule of Three in Fractions.

This being done, you shall multiply the denominator of the first number, by the numerator of the second, and multiply the product thereof again by the numerator of the third number: And so shall you have the dividend or number which must be divided, then multiply the numerator of the first number, by the denominator of the second, and multiply again the product thereof, by the denominator of the third number, and that which commeth of the multiplication, shall be your divisor. Then divide the number which is to be divided by the divisor, and you shall find the fourth number that you seek. Of the which manner and fashions of the rule of 3 are divers kinds, whereof the first is of 3 whole numbers, as was the last example, and here followeth the second.

If 15 pounds do buy me 2 clothes, how many clothes will 300 pounds buy me at the

the same price that the 2 cloaths did set down your three numbers thus.

The Example followeth.

Lib.	Cloaths.	Lib.
15	2	300

And then as you see, you must [illegible] the 3 number which is 300 li. by 2 [illegible] the second number, and thereof [illegible] 600, the which 600 you must divide by [illegible] first number 15, and you shall find in [illegible] quotient 40, which is 40 cloaths, and [illegible] many cloaths shall you buy for 300 li. [illegible] appeareth by practice here above written. And here you must mark, that the [illegible] number and the third in this question [illegible] of one denomination, as before I have [illegible] clared, and likewise the 2 and the fourth [illegible] numbers which you have found, are of [illegible] semblance and likewise; but in case [illegible] the first number and the third in any [illegible] stion be not of like denomination, you [illegible] (in working) bring them to one [illegible] nation or nature, as in [illegible]

wing. If 12 Nobles do gain me 8 French Crowns, how many French owns will 48 pounds gain me? Here u see that the denomination of the first mber is Nobles, and the denomination the third is pounds: wherefore before u do proceed to work by the rule of 3, u first turn the pounds into Nobles, in ltiplying 48 pound by 3, and they make nobles, for there is in every pound of Nobles: or otherwise, if you will, may bring the first number being 12 into pounds by dividing them by 3, thus shall your first and third numbers brought into one denomination; then you set down your 3 numbers in order

If 12 nobles do gain me 8 French owns, what shall 144 nobles gain: the 144 are the nobles which are in Then multiply the third number by the second number 6, and thereof meth 864, the which you must divide nobles, and thereof commeth 72 French Crowns.

So many French Crowns will the gain me

Nobles

Nobles.	Crowns.	Nobles
12.	6.	144
144	120	No
6	864	
864	120	
	1	

There is yet a more exact way wh
to work in the rule of three, which is
You must mark if the third and first
bers in the rule of three, may both be
ded by one like divisor: the which af
have divided them, you shall write
each of the quotients orderly in the
rule of 3, every one of them in hi
place, as though those were 2 of the
bers of your question, and not ch
the middle number, that is to say,
cond. As thus, if 50 Crowns
me 44 yards of cloath, how many
shall I have for 120 Crowns? Ho
may see that the third and the first
bers may be divided by 10. which
number is found 12 times, and
first 5 times. Wherefore you shall
for the 3 number in the rule of three
of 120: and 5 for the first number

50, and let 44 remain still in the midst
the second number, after this sort as
followeth, and then work by the rule as be-
fore.

Crowns.	Yards.	Crowns.
5.	44.	12.
	12.	
	88	3
	44	528 (105 ½
	528	55

You must multiply 44 by 12, and there-
of commeth 528: divide the same 528 by
and you shall find in your quotient 305,
and then so many yards should you have
found, if you had wrought the rule of 3 by
the first numbers proposed. There is yet
certain other varieties in working by the
rule of 3, but for that they require the
knowledge of fractions, and because they
are not so easie as this first way, which is
common, therefore content your selves
with this same, untill you have learned the
fraction, the which by Gods help I in-
tend to set forth in the second part of this
work, incontinently after that I have first
taught you the backer rule of three.

Of

Of the Backer Rule of Three.

The Backer Rule of Three is so c
because it requireth a contrary worki
that, which the Rule of Three direct
teach, whereof I have now treated.
in the direct Rule of three, the greater
third number is, so much the greater
the fourth bee. But here in this backer
it is contrariwise; for the greater the
number is, so much lesser will the fo
be. Then whereas in the rule of thre
rect, the third number is multiplied by
second, and the product thereof divided
the first: here you must multiply
cond number by the first, and divid
product of the same by the third, and
number which commeth in the quot
answereth to the question, for such pro
commeth oftentimes in use: As
for, that if you should work the sam
the rule of three direct, and not to h
regard unto the proposition of the ques
you should then commit an evident
open error.

Example.

If 15 shillings worth of Wine
serve for the ordinary of 46 men wh

Tunne of Wine is worth 12 pounds, for how many men will the same 15 shillings worth of Wine suffice, when the Tun of Wine is worth but 8 pounds: It is certain, that the lower the price is, that the Tun of Wine doth cost, so many more persons will the said 15 shillings in wine suffice. Therefore set down your numbers thus: If 12 pounds suffice 46 men, how many men will 8 pounds suffice? You must multiply 46 by 12, and thereof cometh 552, the which you shall divide by 8, and thereof commeth 69, and unto 69 men will the said 15 shillings worth in Wine suffice, when the Tun of wine is worth but 8 pounds, as hereafter doth appear by practise.

Men.	Lib.	
46	8	
12	7	
92	552	(69
46	88	
552		

2. Likewise a messenger maketh a journey in 24 days, when the day is but 8 hours long: In how many days shall

he make the same journey, when the
is 16 hours in length? Here you
perceive that the more hours there are
a day, the fewer days the messenger will
in going his journey. Therefore
down your numbers thus, as here you
se.

Hours.	Days.	Hours.
12.	24.	16
	12	
	48	
	24	
	288	

And then multiply 24 dais by 12
and thereof commeth 288: divide the
288, by the third number 16, and
shall find 18, the which is 18 days,
in so many days will the messenger
his journey, when the day is 16
long.

Likewise when the Bushell of
doth cost 3 shillings, the peny loaf of
weigheth 4 lib.

I demand what the same peny

weigh when the Bushell of wheat is worth 2 shillings? Here is to be considered, that the better cheap that the wheat is, the heavier shall the peny loaf weigh, and therefore write down your three numbers thus.

Shil.	Lib.	Shil.
3.	4.	2.

3. 12. 12 Lib. 2 (6

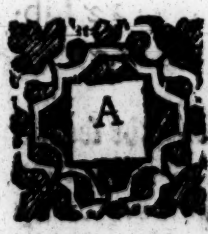
Then multiply 4 lib. which is the second number, by the first number 3, and they make 12, the which 12 you shall divide by the third number 2, and thereof commeth 6. and so much must the peny loaf of bread weigh, when the Bushell of wheat is worth 2 s. as may appear. And now according to my former promise, shall follow the third part of Arithmetick, which teacheth working by Fractions.

Here endeth the first part of Arithmetick.

The second part of Arithmetick, which treateth of Fractions or broken Numbers.

CHAP. 1.

Of Fractions or broken numbers, and the difference thereof.



A Fraction or a broken number, is as much as a part or many parts of 1, which of there are two numbers with a line between both, that is to say, one which is above the line, is called the numerator, the other underneath the line is called the denominator, as by example three quarters is called a fraction, and must be set down thus, $\frac{3}{4}$, whereof 3 which is the higher number above the line is called the numerator, and 4 which is under the line, is called the denominator. And it is always conbenient that the numerator be lesse in number than the denominator. For if the numerator and the

inator be equal numbers, then shall they epresent a whole number thus, as $\frac{1}{1}, \frac{2}{2}, \frac{3}{3}$ which are whole numbers, by reason that he numerators of these, and all such like ay be divided by their denominators, and he quotients will always be but 1. But case that the numerator of any fraction exceed his denominator, then it is more an one whole: as $\frac{29}{18}$ is more than a hole number by $\frac{11}{18}$ and this is properly lled an improper fraction: other definiion doth not hereunto appertain. Furermore it is to be understood, that when e numerator is just the half of the denoinator, then the same broken number is just half of one whole, as $\frac{6}{12}\ \frac{7}{14}\ \frac{8}{16}\ \frac{9}{18}$, d the other like are the halfs of one hole number whether it be of money, of asure, of weight, or any other thing, ereof doth grow and come forth 2 proessions natural: the one proceeding by menting or increasing, as these.

$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \frac{8}{9}, \frac{9}{10}$. &c.

And they do proceed infinitely, and will ver reach to make a whole number, thus and the other progression, doth progree by diminishing or decreasing, as thus:

$\frac{1}{2}\ \frac{1}{3}\ \frac{1}{4}\ \frac{1}{5}\ \frac{1}{6}\ \frac{1}{7}\ \frac{1}{8}\ \frac{1}{9}\ \frac{1}{10}$ &c.

And these do proceed infinitely, shall never come to make a 0, which signifieth nothing, but shall ever retain certain value of an unity, whereby it appear that fractions or broken numbers are infinite.

CHAP. 2.

Of the reducing or bringing together 2 Fractions, or many of divers denominations, unto Fractions of one like denomination.

REduction, is as much as to duce and bring together to put 2 or many numbers being of divers denominations one from the other to Fractions of one denomination, ing the unto a common denominator, reason hereof is. For because the difference of the broken numbers is of the denominators part, or of divers nominators, and for the understanding hereof, there is a general rule, whose ration or working is thus: Multiply denominators of the Fractions, the

be other, and so you shall habe a new denominator common to all the fractions, the which denominator you must dibide by the particular denominators of ebery of the said fractions, and multiply ebery quotient by his own numerator, and so you shall habe new numerators, for the numbers which you would reduce, as appeareth by this example following.

Reduction in common denomination.

If you will reduce $\frac{2}{3}$ and $\frac{4}{5}$ together, first make a crosse between the two fractions as here you see, and then you must multiply the two denominators the one by the other, as thus, 3 by 5 maketh 15, which is your common denominator: set that under the crosse, then dibide 15 by the denominator 3, and you shall habe 5, which multiply by the numerator 2, and you shall find 10, set that ober the $\frac{2}{3}$, and they are $\frac{10}{15}$ for the $\frac{2}{3}$, afterwards dibide 15 by the denominator 5, and thereof commeth 3, the which multiply by the numerator 4, and you shall find

10
2
3

X

12
4
5

15

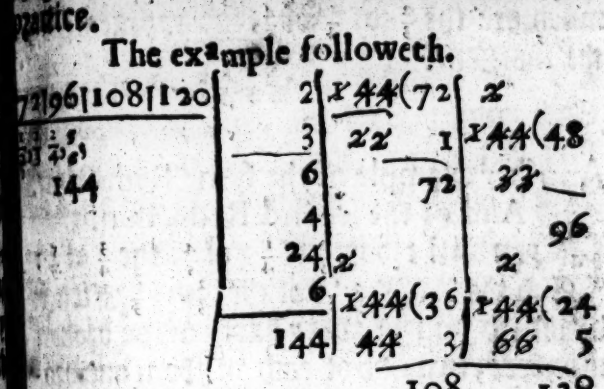
find 12, which set ober the head of the
they make $\frac{2}{12}$ for the $\frac{4}{5}$: as appeareth
plainer above in the margent.

2 If you will reduce $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{5}{6}$, together,
must multiply all the denominators,
one by the other, that is to say, 2 by 3
keth 6: then 6 by 4 amounteth to 24. L
of all 24 by 6, and thereof commeth 14
for the common denominator. Then
the first fraction which is $\frac{1}{2}$, divide 144
the denominator 2, and thereof comm
72, the which multiply by the numera
1, & it is still 72, set that ober the $\frac{1}{2}$ &
is $\frac{172}{144}$, for the $\frac{1}{2}$. Then divide 144 by the
cond denominator 3, and thereof comm
48, the which multiply by the second
merator 2, and they are 96, which set o
the $\frac{2}{3}$, and they make $\frac{96}{144}$ for the $\frac{2}{3}$. Th
divide 144 by the third denominator 4
thereof commeth 36, the which mult
by the third numerator 3, and they m
108, which set ober the $\frac{3}{4}$ and they are
for the $\frac{3}{4}$.

Finally divide 144 by the last denom
nator 6, and thereof commeth 24: the wh
multiply by the last numerator 5, & the
of commeth 120, which set ober the $\frac{5}{6}$

they are $\frac{1}{144}$ of the $\frac{5}{6}$ as appeareth here by practice.

The exᵃmple followeth.



Reduction of broken numbers of broken.

If you will reduce the broken of broken together, as thus, the $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must multiply all the numeratoꝛs, the one by the other, to make one broken number of the three broken numbers: that is to say, 2 by 1 maketh 2: and then 2 by 4 maketh 8, which 8 is your numeratoꝛ.

Then multiply the Denominatoꝛs the one by the other, that is to say, 3 by 4, maketh 12, and then 12 by 5 maketh 60, foꝛ your denominatoꝛ, set 8 ouer 60, with a line between them and they be

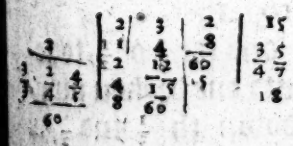
8
2, 1, 4
3 4 5
60

be $\frac{8}{60}$ which being abzebied, are $\frac{2}{15}$, and so much are the $\frac{2}{3}$, of $\frac{1}{4}$, of $\frac{4}{5}$, as appeareth in the margent.

Another example of the same Reduction. And of the second Reduction.

If you will reduce $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, the $\frac{3}{4}$ of $\frac{5}{7}$, And the $\frac{1}{2}$, of the $\frac{1}{2}$, of the $\frac{2}{3}$, of $\frac{1}{3}$. First, it behoveth you of ebery party of the broken numbers, to make of each of them one broken, as by the third Reduction is taught, that is to say, in multiplying the numerators by numerators, and denominators by denominators. First, for the first part which is $\frac{2}{3}$ of $\frac{1}{4}$, of $\frac{4}{5}$, you must as is before said, multiply 2 by 1, and then by 4, and you shall have 8 for the numerator: likewise multiply 3 by 4, and the product by 5, and you shall have 60 for the denominator: so they make $\frac{8}{60}$, which being abzebied are $\frac{2}{15}$, for the first part, that is to say, for the $\frac{2}{3}$ of $\frac{1}{4}$: secondly, for the $\frac{3}{4}$ of $\frac{5}{7}$, multiply likewise the numerator 3 by 5, maketh 15 for the numerator. And multiply 4 by 7, maketh 28 for the denominator, And then they be $\frac{15}{28}$, for the second part: that is

to say, for the $\frac{3}{4}$ of $\frac{5}{7}$. Thirdly, for the $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{2}{3}$, of $\frac{1}{3}$, you must multiply the numerators the one by the other, that is to say, 1 by 1, and then by 2, and last by 1, and all maketh but two for the numerator: likewise multiply the denominators 2 by 2, maketh 4, and 4 by 3 maketh 12, and then 12 by 3 maketh 36, for the denominator: and they are $\frac{2}{36}$ which being abbebied maketh $\frac{1}{18}$, for the third part; that is to say, for $\frac{1}{3}$ of the $\frac{1}{3}$, of $\frac{2}{3}$ of $\frac{1}{3}$. Last of all, take the $\frac{2}{15}$ the $\frac{15}{28}$, and $\frac{1}{18}$, and reduce them according to the order of the second reduction, and you shall find $\frac{1008}{5560}$ for the $\frac{2}{15}$. And $\frac{4050}{7560}$ for the $\frac{15}{28}$. And $\frac{420}{7560}$ for the $\frac{1}{18}$, and thus are broken numbers of broken reduced, as appeareth by practice.



1008 4050 420

$\frac{2}{25}$, $\frac{15}{28}$, $\frac{1}{18}$

7560

15	202		15	(270
28	7560	(508	390	15
120	1555	2	7560	1350
30	11	1008	2888	270
420				
18			22	4050
3360		1		
420		330		
7560		7560	(420	
		1888	1	
		11	420	

Reduction of broken numbers, and the parts of broken together.

If you will reduce $\frac{1}{2}$, and the $\frac{1}{3}$ of $\frac{1}{2}$, together, to bring them into one broken number, you must first set down the $\frac{1}{3}$ and $\frac{1}{2}$, as appeareth in the margent with a crosse betwéen them, and then multiply the two denominators, the one by the other, that is to say, 2 by 3 maketh 6,

$$\frac{1}{3} \times \frac{1}{2}$$

3

6

set

set that under the crosse, then multiply the first numerator 1, by the last denominator 4, and that maketh 2, unto the which adde the last denominator 1, and they be three, which set above the crosse, so shall you find the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, do make $\frac{3}{6}$ which being abredied doth make $\frac{1}{2}$ which is as much as the $\frac{1}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$, being reduced into one fraction. Likewise if you will reduce the $\frac{1}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$, you must do as before, set down the $\frac{2}{3}$ and $\frac{1}{4}$, with a crosse between them, then multiply the denominators the one by the other, that is to say, 3 by 4 maketh 12: which set under the crosse as you see in the margent, and then multiply the first numerator 2, by the last denominator 4, and thereof commeth 8, whereunto adde the last numerator 1, and that maketh 9, which 9 set ober the cross, so shall you find that the $\frac{2}{3}$ and the $\frac{1}{4}$ of $\frac{1}{3}$ are worth $\frac{9}{12}$, the which abredied do make $\frac{3}{4}$ as appeareth by example in the margent.

Reduction.

Reduction of whole Numbers and broken together in a Fraction, the which Fraction is called an improper Fraction.

IF you will reduce whole Number and broken into broken, you shall reduce the whole number into broken, as by this example may appear: if you will reduce 17 $\frac{5}{8}$ into a broken number, first you must multiply the whole number 17 by the denominator of the broken, which is 8, in saying 8 times 17 do make 136, unto the which you must adde the numerator of $\frac{5}{8}$ which is 5, and all amounteth to 141, which set over $\frac{5}{8}$ with a line between them, and they will be $\frac{141}{8}$ so much is 17 $\frac{5}{8}$ worth in an improper fraction, as appears here by practice.

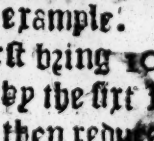
17	141		
8		17 $\frac{5}{8}$	maketh $\frac{141}{8}$
136			
5			
141			

In case you have whole numbers and broken to be reduced with broken, you must bring the whole number into his broken, by multiplying it by the denominator of the

broken number going therewith, and adde thereunto the numerator of the said broken number, as in the last example is declared, and then reduce that broken number with the other broken, as here appeareth by this example. Reduce $10\frac{2}{3}$ and $\frac{4}{7}$, together, first bring $10\frac{2}{3}$ all into thirds, as it is taught by the first Reduction, and you shall find $\frac{32}{3}$ then reduce the $\frac{32}{3}$ and $\frac{4}{7}$ together by the first reduction, and you shall find $\frac{224}{21}$, for the $\frac{32}{3}$: and $\frac{12}{21}$ for $\frac{4}{7}$ as appeareth here by practice.

$10\frac{2}{3}$ 32 224

3 32



12. 32. 4.

7. 3.

21 224 12.

Also in case you have in both parts of your reduction, as well whole numbers as broken, you must always put the whole of each part into his broken, as by the 6 Reduction is taught.

Example.

If you will reduce $12\frac{3}{4}$ with $14\frac{2}{3}$, to bring them into one denomination, first bring the $12\frac{3}{4}$ all into fourths, and you shall find $\frac{48}{4}$: then likewise reduce $14\frac{2}{3}$, all into thirds,

thirds, and you shall have $\frac{44}{3}$ for the 14[illegible] then reduce $\frac{49}{4}$ and $\frac{44}{3}$ together, by the [illegible]der of the first reduction, and you shall [illegible] $\frac{147}{12}$, for the $\frac{49}{4}$, And $\frac{176}{12}$. for the $\frac{44}{3}$: as [illegible] by practice doth plainly appear.

$$\frac{49|44|147}{12\frac{1}{2}|14\frac{2}{3},\frac{49}{4}} \quad \mathbf{X} \quad \frac{176}{\frac{44}{3}}$$

12

CHAP. 3.

Of Abbreviation of one broken numb[illegible] into a lesser broken.

ABbreviation is as much [illegible] to set down, or to writ[illegible] broken number by figu[illegible] of lesse signification, [illegible] not diminishing the va[illegible] thereof. The which to [illegible] there is a rule, whose operation is thus; [illegible] vide the numerator, and likewise the [illegible] nominator, by one whole number, [illegible] greatest that you may find in the [illegible] broken number, and of the quotient of [illegible]

numerator, make it the enumerator, and likewise of that of the denominator, make it your denominator, as by example.

1 If you will abbreviate $\frac{54}{81}$, you shall understand that the greatest whole number that you may take, by the which you may divide the numerator, and the denominator, is 27, which is the half of the denominator, and that is a whole number, for you cannot take a whole number out of the denominator 81, which will divide both the numerator and the denominator, but that there will be either more or lesse than a whole number, therefore if you divide 54 by 27, you shall finde in the quotient 2 for the numerator: likewise if you divide 81 by 27 you shall have in the quotient 3 for the denominator: then put 2 over the 3, with a line between them, and you shall find $\frac{2}{3}$,

54
81

xo
54 (3
27

2
3

and

and thus by this rule the $\frac{28}{81}$ are abbrebiated unto $\frac{2}{3}$: as appeareth in the margent, and so is to be understanded of all other.

28 | 81 (3
27

The form and manner how to find the greater number, by the which you may wholly divide the numerator and denominator (to the end ye may abreviate them) is thus.

FIrst, dibide the denominator by the numerator, and if any number do remain let your dibisor be dibided by the last number, and so you must continue until you habe so often times dibided that there may nothing remain, then it is to be understood that your last dibisor (wherewith you did end, and that 0 did remain after your last dibision) is the greatest number by the which you must abbreviate: as did in the last example. But in case your last dibisor be 1, it is a token

the same number cannot be abbreviated to any lower fraction than you find it at the first. Example of $\frac{54}{81}$ divide 81 which is the denominator by 54, which is his numerator, and there resteth 27, then divide 54 by 27, and there remaineth 10, which is nothing, wherefore your last divisor 27. is the number by which you must abbreviate $\frac{54}{81}$: as in the last example is specified.

Another manner of Abbreviation.

2 Mediate the numerator, and also the denominator of your Fraction, in case the numbers be even, that is to say, take always the half of the numerator, and likewise of the denominator, and of the mediation or half of the numerator, make it your numerator, also of half the denominator make your denominator, and so continue as often as you may in taking always the half of the numerator, and likewise of the denominator, or else see if you may abbreviate the numbers which do remain by 3, by 4, by 5 6, 7, 8, 9, or by 10: for you must abbreviate them as often as you can by any of the said numbers. And it is to be noted, that with whatsoever numbers of these, you do abbreviate the numerator

of your fraction, by the same you must abbreviate likewise the denominator, so continuing untill they can no more be abbreviated. And it is to be understood, that if the Numerator and the Denominator be eben numbers, as you may know when the first figure is an eben number, or a 0, then may you perceive if both the Numerator and the Denominator may be abbreviated by 10, by 8, by 4, or by 2: albeit that sometimes they may be abbreviated by 3. And if they be odd numbers, then must you consider if they may be abbreviated by 9, by 7, by 5, or by 3: but when the first number as well of the numerator, as of the denominator, are eben numbers, then may you well know that such numbers may be abbreviated by 2 as is aforesaid. And if you adde the figures of the numerator together in such manner as you do in making the proof by 9 in whole numbers, that is, if you find it appeareth that you may abbreviate that number by 9, and likewise by 3, and sometime by 6, if you find 6 it may be abbreviated by 6, and always by 3, if you find 3: it is a sign that you abbreviate by 3. And whatsoever number that you do abbreviate the numerator, by the same you

abbreviate likewise the denominator, and if the first figures of the same number be 5 or 0, you may abbreviate them by 5, but if the first figures be both 0, they may be abbrevied by 10: in cutting away the 2 Ciphers thus, as $\frac{20}{30}$ which maketh $\frac{2}{3}$ and sometimes by 100, thus, as $\frac{100}{200}$, in cutting away the four Ciphers after this sort, $\frac{100}{200}$ and then $\frac{100}{200}$ do make $\frac{1}{2}$, and after this manner have I set here divers examples, although that all broken numbers cannot be abbrevied by this rule, yet all fractions may be well abbrevied by the first rule aforesaid.

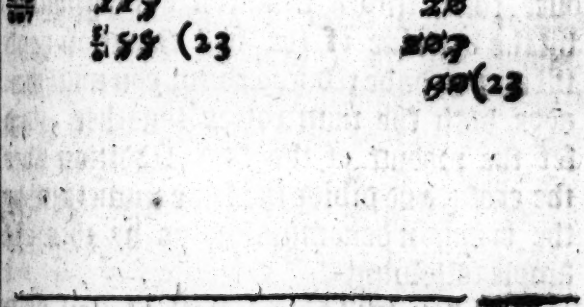
Abbrevied.

$\frac{310}{610}$ by 10.	$\frac{1890}{4795}$ by 9,
$\frac{384}{768}$ by 8.	$\frac{210}{525}$ by 7.
$\frac{48}{96}$ by 6.	$\frac{30}{75}$ by 5.
$\frac{8}{16}$ by 4.	$\frac{6}{15}$ by 3.
$\frac{4}{8}$ by 2.	$\frac{2}{5}$
$\frac{1}{2}$	

3 Furthermore you shall understand that sometimes it happeneth that all the figures of the numerator are equal unto them of the denominator, which when it so happeneth, you may then take one of them of the numerator, and also one of them of the denominator, and it shall be abbrebied, as $\frac{555}{888}$ being abbrebied after the manner commeth to $\frac{5}{8}$. And yet it happeneth sometimes, that two or many figures of the numerator are proportioned unto two or many figures of their denominator, and that the other figures of the same number are the figures one to the other, in this proposition following. Then may you take two or more figures, as well of the numerator as of the denominator, and by this manner the same number shall be abbrebied; as $\frac{4747}{5959}$ being abbrebied by the rule do come to $\frac{47}{59}$.

4 Also it happeneth sometimes, that you would abbrebiate one number unto the semblance or likeness of another. And to know if the same may be abbrebied, and also by what number it may be abbreviated, you must divide the numerator of one number by the numerator of the other: and likewise the denominator of the one by the denominator of the other,

in case that after every division there do remain 0, and that the two quotients be equal, then is one of them the number by the which the said fraction must be abbreviated, as by example of $\frac{115}{207}$, I would know if they may be abbreviated unto $\frac{5}{9}$, and for to do this, you must divide 115 by 5, and you must divide 207 by 9, and there will come into both the quotients 23: by the which it appeareth that this number may be abbreviated by 23.



The fourth Chapter treateth of the addition of two or many broken numbers together, as by example.

TO add Fractions or broken numbers together, there is a general rule which is thus; If the numbers be of unlike denominations one to the other, you must reduce them into a common denomination by the doctrine of the first reduction: and when you have reduced them, you must then add both the numerators together, and set the product of the said Addition above the cross, and divide the same numerator by the common denominator, as by this example following.

1 If you will adde $\frac{2}{3}$ with $\frac{3}{4}$, you must first reduce the two Fractions both into one denomination, according to the order of the first reduction, that is to say, in multiplying the denominator of the first fraction which is there, by the Denomina-

of the ether fraction, which is 4, & they make 12 for your common denominator: the which 12 you shall set under the crosse, then multiply the first numerator by the last denominator 4, & thereof commeth 8, which set ober the $\frac{2}{3}$ and then multiply the last numerator 3, by the first denominator 3, and thereof commeth 9, which you must set ober the $\frac{3}{4}$, then adde the numerator 8, with the numerator 9, & they make 17, which set ober the crosse, & then your fraction will be $\frac{17}{12}$: which is the Addition of the $\frac{2}{3}$ with $\frac{3}{4}$. And because the numerator 17, is greater than his denominator 12, therefore you must divide 17 by 12, and thereof will come 1, and 5 remaining, which 5 you must set apart, and 12 under the same with a line between them, and they are worth $1\frac{5}{12}$, and so much are the $\frac{2}{3}$ added with $\frac{3}{4}$ as doth appear.

$$\begin{array}{cccc} & 17 & & \\ 8 & \times & 9 & \\ \frac{2}{3} & 12 & \frac{3}{4} & \\ & 5 & & \\ & 17 & & \\ & 12 & (1\frac{5}{12} & \end{array}$$

Addition in broken numbers.

2 Also if you will adde $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ together,

ther, you must first adde the $\frac{1}{2}$ and $\frac{2}{3}$ together, according to the doctrine of the last rule, and you shall find $\frac{7}{6}$, then adde $\frac{3}{4}$ together by the said last rule, and they make $\frac{31}{20}$, Then finally adde the $\frac{7}{6}$ (which came of the $\frac{1}{2}$ and $\frac{2}{3}$ added together) with $\frac{31}{20}$, which came of the $\frac{3}{4}$ and $\frac{4}{5}$ added together) and you shall find by the aforesaid Addition, that they amount unto [illegible] Wherefore divide 326 by 120, and there commeth 2, and 86 remaineth, which is [illegible] of one whole, and they being abbreviated make $\frac{43}{60}$, and thus the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{4}{5}$ being added together, do amount to 2 and $\frac{43}{60}$ [illegible] here under doth appear.

$$\frac{3}{} \quad \frac{4}{} \quad \frac{15}{} \quad \frac{16}{}$$

$$\frac{1}{2} \times \frac{2}{3} \qquad \frac{3}{4} \times \frac{4}{5}$$

$$7 \qquad 31$$

$$6 \qquad 20$$

$$\frac{140}{} \quad \frac{186}{}$$

$$326$$

$$\frac{7}{6} \times \frac{31}{20}$$

$$120$$

$$\cancel{18}$$

$$\cancel{326}$$

$$\cancel{120}\ (2\tfrac{43}{60}$$

Addition of broken numbers of broken.

3 Furthermoze, if you will adde the bzo-
ken numbers of bzoken together, as to
dde the $\frac{1}{3}$ of $\frac{3}{4}$ of $\frac{4}{7}$ with the $\frac{1}{6}$ of $\frac{1}{2}$ of $\frac{1}{8}$ first
ou muſt reduce the number according to
e order of the fourth reduction, in multi-
plying the numeratozs of the first 3 fracti-
ns, the one by the other, and of the pzo-
uct make your numeratoz, and likewiſe,
ou muſt multiply the denominatozs of
e foresaid thzee fractions, the one by the
ther, and of the pzoduct make your de-
ominatoz, and you ſhall find $\frac{3}{60}$ foz the
irſt thzee bzoken numbers, the which be-
ng abbzebied, do make $\frac{1}{7}$, then reduce the
ther thzee fractions, by the ſaid fourth re-
uction, in multiplying the numeratozs by
umeratozs, and denominatozs by denomi-
atozs, as you did by the first thzee bzo-
en numbers akoresaid, and you ſhall
nd $\frac{15}{960}$, then muſt you adde the $\frac{3}{7}$ which
ame of the first 3 bzoken numbers, and
$\frac{15}{960}$ which are come of the laſt thzee fracti-
ns, both together, by the inſtruction
f the first Addition: and you ſhall
nd $\frac{3117}{4480}$: which cannot be abbzebiated
ut is the ruſt pzoduct of the addition of
uch are $\frac{2}{3}$ $\frac{3}{4}$ of $\frac{4}{7}$ added with the $\frac{1}{6}$ of $\frac{1}{2}$ of
$\frac{1}{8}$

$\frac{5}{12}$ as hereafter by practice both ebident appear.

24 — 25

$\frac{2}{3}$ $\frac{3}{4}$ $\frac{4}{5}$ — $\frac{5}{6}$ $\frac{1}{2}$ $\frac{5}{8}$

60 — 96

317

192 — 125

$\frac{2}{5}$ X $\frac{25}{96}$ — 317 / 480

480

Addition of broken numbers and parts of broken, with broken, and the parts of broken together.

4 Likewise if you will adde the $\frac{2}{3}$ and the $\frac{1}{2}$ of $\frac{1}{3}$ with the $\frac{4}{5}$ and $\frac{1}{4}$ of $\frac{1}{5}$, you must reduce the $\frac{21}{32}$ first into one fraction, by the doctrine of the fift reduction, and thereof commeth $\frac{5}{6}$, for the $\frac{2}{3}$ and $\frac{1}{2}$ of the said third: then reduce the $\frac{4}{5}$ and $\frac{1}{4}$ by the said fift reduction, and thereof commeth $\frac{17}{20}$.

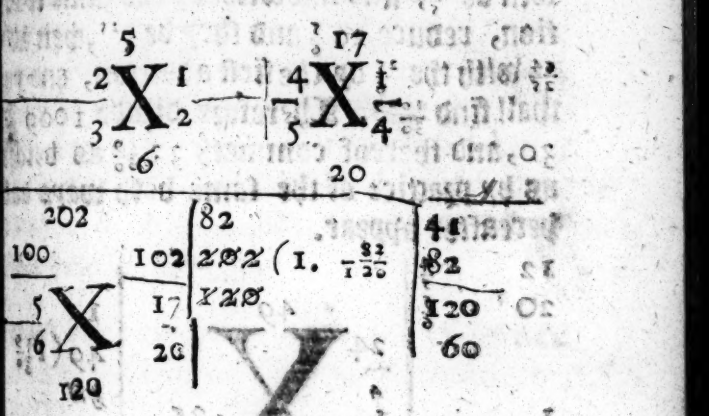
Last of all, adde the $\frac{5}{6}$ and $\frac{17}{20}$ together according to the first rule of Addition: and you shall find $\frac{201}{120}$ which being dibided

being

ringeth 1, & $\frac{82}{120}$ parts remaining, which
bbrebied maketh $\frac{41}{60}$, and thus you do per-
eive that the $\frac{2}{3}$ and $\frac{1}{2}$ of $\frac{1}{3}$, added with the
and $\frac{1}{4}$ of $\frac{1}{5}$, do amount unto 1 $\frac{41}{60}$ as hereaf-
er by practice doth plainly appear.

$$\frac{2}{3}\overset{5}{\underset{6}{X}}\frac{1}{2} \qquad \frac{4}{5}\overset{17}{\underset{20}{X}}\frac{1}{4}$$

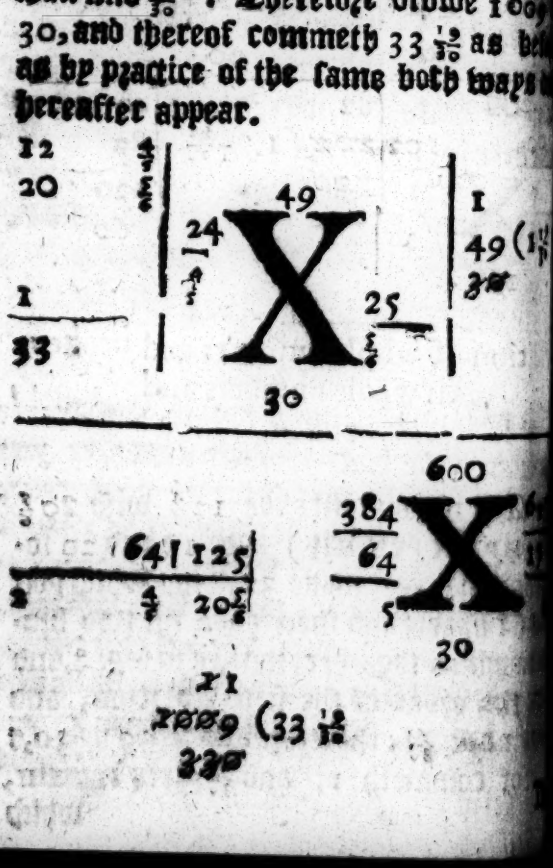
202		82	41
100	102	~~202~~ (1. $\frac{82}{120}$	82
$\frac{5}{6}$ X	17	~~120~~	120
120	20		60



Addition of whole numbers and broken, with whole numbers and broken.

5 Also if you will adde 12 $\frac{4}{5}$ with 20 $\frac{5}{6}$
ou may (if you will) adde 12 and 20 to-
ether, and they make 32, the which you
all set apart, and then adde the two bro-
en numbers together, that is to say, $\frac{4}{5}$, and
by the order of the first Addition, and
hey make $\frac{49}{30}$: therefore divide 49 by 30, &
hereof commeth 1, and $\frac{19}{30}$ parts remain,
which

which 1 you muſt adde unto the 32, which were put apart, and the whole Addition will be $33\frac{19}{30}$. Or otherwiſe, you may reduce $12\frac{4}{5}$ into the likeneſs of a Fraction by the order of the fifth reduction, and it will be $\frac{64}{5}$, and likewiſe by the ſame reduction, reduce $20\frac{5}{6}$ and they be $\frac{125}{6}$, then $\frac{64}{5}$ with the $\frac{125}{6}$ by the firſt addition, and you ſhall find $\frac{1002}{30}$. Therefore dibide 1002 by 30, and thereof commeth $33\frac{19}{30}$ as before, as by practice of the ſame both ways ſhall hereafter appear.



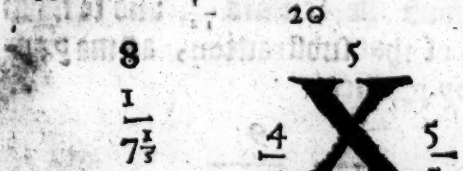
The fifth Chapter treateth of Subſtraction in broken numbers.

1 If you will ſubſtract $\frac{3}{4}$ from $\frac{8}{9}$, you muſt firſt reduce both the fractions into a common denomination, by the doctrine of the firſt reduction, and you ſhall find $\frac{8}{12}$ for the $\frac{2}{3}$ and $\frac{9}{12}$ for the $\frac{3}{4}$. Therefore abate the numerator 8 from the numerator 9, and there will remain 1, which 1 you muſt ſet ober the croſs, and the ſame is $\frac{1}{12}$, and ſo much is the reſt of that ſubſtraction, as may appear here by practice.

$$\frac{8}{9} - \frac{3}{4} = \frac{1}{12}$$

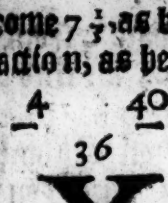
2 But if you have a broken number to be ſubſtracted from a whole number, you muſt borrow one unit of the whole number, and reſolve it into a fraction of like denomination, as is that fraction, which you would abate from the ſame whole number, and then abate the ſaid fraction therefrom, and you ſhall find what doth remain, as by this example. If you abate $\frac{3}{4}$ from 8, you muſt

must borrow one of the said 8, and re[duce] it into fifties like unto the fraction, bec[ause] it is $\frac{4}{5}$, so that 1 will be 5 fifts thus $\frac{5}{5}$ th[ere]fore abate $\frac{4}{5}$ from $\frac{5}{5}$, and there will re[main] $\frac{1}{5}$, and subtract the 1 which you borrow[ed] from 8, and there doth remain 7, and $\frac{1}{5}$ also which remained after the said $\frac{4}{5}$ [was] abated. Thus the $\frac{4}{5}$ being subtracted fr[om] 8, doth leave $7\frac{1}{5}$ as by practice doth pla[in] appear.

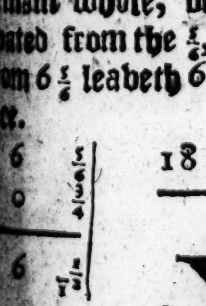


Or otherwise you shall put 1 under with a line between, and that will b[e] then set down the $\frac{4}{5}$ and the $\frac{8}{1}$ with a [line] between them, then must you reduce [them] into one denomination by the first rule, and you shall find 4 over the $\frac{4}{5}$, and over the $\frac{8}{1}$, then subtract the said 4 from [8] and there will remain 36, the which [you] shall set over the cross, and they do [make] $\frac{36}{5}$. Likewise you must multiply the [de]nominator 5 by 1, maketh 5, set that [under] the cross, then divide 36 by 5, and th[ere]

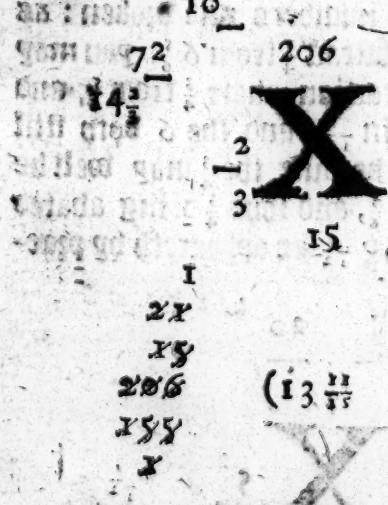
will come $7\frac{1}{3}$, as before, for the rest of that substraction, as here by practice appeareth.



3 If you will substract broken numbers from whole numbers and broken: as if you would substract $\frac{3}{4}$ from $6\frac{1}{6}$, you may by the first substraction abate $\frac{3}{4}$ from $\frac{1}{6}$, and there will remain $\frac{1}{12}$, and the 6 doth still remain whole, because the $\frac{3}{4}$ may well be abated from the $\frac{1}{6}$, and thus $\frac{3}{4}$ being abated from $6\frac{1}{6}$ leaveth $6\frac{1}{12}$ as appeareth by practice.



Likewise if you will abate $\frac{2}{3}$ from $14\frac{2}{7}$ you must first reduce $14\frac{2}{7}$ all into fifth by the fifth reduction, and they be $\frac{72}{5}$ then reduce $\frac{2}{3}$ and $\frac{72}{5}$ into a common denomination, by the first reduction, and you shall find $\frac{10}{15}$ for the $\frac{2}{3}$ and $\frac{216}{15}$ for the $\frac{72}{5}$: then substract the numerator 10 of the first fraction, from the numerator 216 of the second fraction, and there remaineth $\frac{206}{15}$. Therefore divide 206 by 15 and thereof commeth $13\frac{11}{15}$, and so much remains of this Substraction, as may appear in the example following.



4 If you will substract whole numbers and broken from whole and broken,

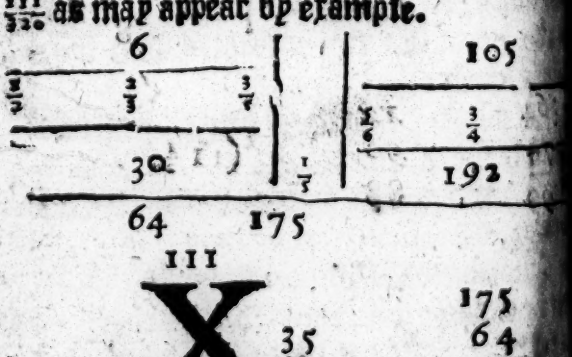
thus, if you will substract $9\frac{1}{4}$, from $20\frac{1}{2}$, you must reduce $9\frac{1}{4}$ into fourths, and likewise the $20\frac{1}{2}$ into halfs, by the sixth reduction: and you shall find $\frac{37}{4}$ for the $9\frac{1}{4}$: and $\frac{41}{2}$ for the $20\frac{1}{2}$. Then reduce $\frac{37}{4}$, and $\frac{41}{2}$ into one denomination, according unto the first reduction, and you shall find $\frac{74}{8}$ for the $\frac{37}{4}$ and $\frac{164}{8}$ for the $\frac{41}{2}$, then abate the numerator of $\frac{74}{8}$ which is 74, from 164 which is the numerator of $\frac{164}{8}$ and there remaineth $\frac{90}{8}$, then divide 90 by 8, and thereof commeth $11\frac{1}{4}$ which is the remainer of this substraction.

$$\frac{37}{9\frac{1}{4}} \quad \Big| \quad \frac{41}{20\frac{1}{2}} \quad \Big| \quad \begin{array}{ccc} 74 & & 164 \\ & 90 & \\ \underline{37} & \times & \underline{41} \\ 4 & & 2 \\ & 8 & \end{array}$$

364	~~12~~	
74	~~90~~	(11 $\frac{1}{2}$
90	~~88~~	

Subſtraction of broken Numbers of broken, from Fractions of Fractions.

5 If you will ſubſtract the $\frac{1}{5}$ of $\frac{2}{1}$ of from the $\frac{5}{6}$ of $\frac{3}{4}$ of $\frac{7}{5}$, you muſt firſt bring the $\frac{2}{1}$ of $\frac{3}{5}$ into one Fraction by the firſt reduction: and the $\frac{5}{6}$ of $\frac{3}{4}$ of $\frac{7}{5}$ likewiſe into one Fraction by the ſame reduction, then you ſhall find $\frac{6}{30}$ for the firſt three broken numbers, which being abbreviated do make $\frac{1}{5}$: and for the other three broken Numbers you ſhall find $\frac{105}{192}$; which being likewiſe abbreviated do make $\frac{35}{64}$ then you ſhall ſubſtract $\frac{1}{5}$ from $\frac{35}{64}$ by the inſtruction of the firſt Subſtraction in reducing both the Fractions into a common denomination, as is done, and you ſhall find remaining $\frac{111}{320}$ as may appear by example.



The sixth Chapter is of Multiplication in broken Numbers.

FIrst, for to multiply in broken numbers, there is a rule, which is thus, you must multiply the numerator of the one Fraction, by the numerator of the other. And likewise you must multiply the Denominator of the one by the Denominator of the other. And then divide the Fraction if it may be divided, or else abbreviate it if it may be abbreviated, and it is done. But if there be whole numbers and broken together, you must reduce the whole numbers into their broken, and adde thereunto the Numerator of his broken, and then multiply as it is before said, as also hereafter by examples shall more plainly appear.

1 If you will multiply $\frac{1}{3}$ by $\frac{3}{4}$, you must multiply the Numerator 2 by the Numerator 3, and thereof commeth 6 for the Numerator. Likewise you must multiply the denominators the one by the other, that is to say, 3 by 4, and thereof commeth 12 for the Denominator: so that this multiplication commeth to $\frac{6}{12}$ which being

abbrevied do make $\frac{1}{2}$: and so much amo[illegible]teth the multiplication of the $\frac{2}{3}$ by [illegible] by practice appeareth.

6 1

$\frac{2}{3}$ $\frac{3}{4}$

12

2 Likewise if you will multiply a b[illegible]ken number by whole numbers, or wh[illegible] numbers by broken, which is all one, [illegible] $\frac{4}{5}$ by 18, or else 18 by $\frac{4}{5}$, you must set 1 [illegible]der 18 thus, $\frac{18}{1}$, and then multiply the [illegible]merator 18 by the numerator 4, and th[illegible] of commeth 72. Likewise multiply [illegible] Denominator 5, by the denominator 1, [illegible] thereof commeth 5, then divide 72 by [illegible] denominator 5, and thereof commeth 14 [illegible] for the whole multiplication. Or oth[illegible]wise, abate from 18 his $\frac{1}{5}$ part, which is [illegible] $\frac{3}{5}$ and there remaineth 14 $\frac{2}{5}$, as hereaf[illegible] followeth.

72 2

$\frac{4}{5}$ $\frac{18}{1}$ 72 (14 [illegible]

5 5

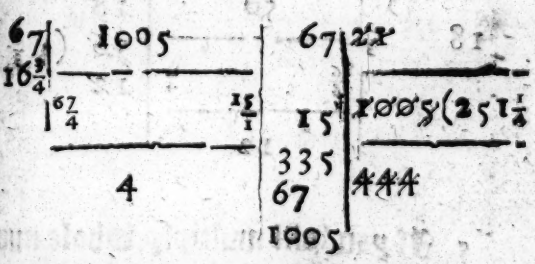
Otherwise.

18 3

$\frac{10}{1}$ $\frac{1}{5}$ 18 (3 $\frac{1}{5}$

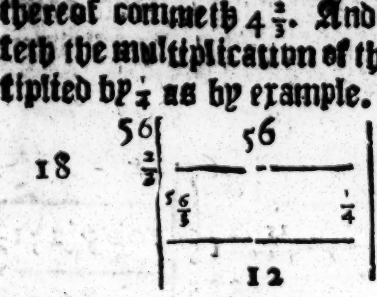
5 5

3 Also if you will multiply a whole number, by whole numbers and broken, or else whole number and broken by a whole number which is all one, as by example: If you will multiply 15 by $16\frac{3}{4}$, or else $16\frac{3}{4}$ by 15: First reduce $16\frac{3}{4}$ all into fourths, multiplying 16 by the Denominator of $\frac{3}{4}$ which is 4, and thereof commeth 64, whereunto adde the Numerator 3, and it maketh $\frac{67}{4}$: which multiply by $\frac{15}{1}$ according to the instruction of the last example, and you shall find the Product of this Multiplication to be $251\frac{1}{4}$, as by following practice doth appear.



4 And if you will multiply a broken number by whole numbers and broken, or else whole numbers and broken by a broken: As by example, if you will multiply $\frac{3}{4}$ by $18\frac{3}{4}$, or else $18\frac{3}{4}$ by $\frac{3}{4}$, which is all one,

you must reduce the whole number [illegible] his broken by the sixth reduction. [illegible] you shall find $\frac{56}{3}$, which you shall multiply by the $\frac{1}{4}$ after the doctrine of the first multiplication, that is to say, in multiplying the Numerator 56 by the Numerator 1, which is 1: and it is still 56, because doth neither multiply nor divide. [illegible] likewise you must multiply the Denominator 3, by the Denominator 4, and it maketh 12: then divide 56 by 12, and thereof commeth $4\frac{2}{3}$. And so much amounteth the multiplication of the said $18\frac{2}{3}$ multiplied by $\frac{1}{4}$ as by example.



5 If you will multiply whole numbers and broken with whole and broken, you must first put either whole numbers into broken, according to the instruction of the sixth reduction, and then multiply one numerator by the other, and of the Product make your numerator. Likewise multiply the denominators one by the other, and thereof make the

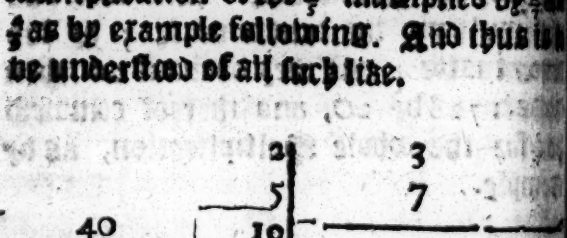
Denominator, then divide the Numerator by the Denominator, and the quotient shall be the increase of this Multiplication. Example, If you would multiply 12 $\frac{4}{5}$ by 6 $\frac{3}{4}$: first by the fifth reduction the 12 $\frac{4}{5}$ will make $\frac{64}{5}$, and the 6 $\frac{3}{4}$ will make $\frac{27}{4}$ then multiply the Numerator 64, by the Numerator 27, and thereof commeth 1728 for the Numerator. And then you must multiply the denominator 5 by the denominator 4, and they do make 20: then divide 1728 by 20, and thereof commeth 86 $\frac{2}{5}$ for the whole Multiplication, as by example.

1728	
64	27
12 $\frac{4}{5}$	6 $\frac{3}{4}$
20	

64	
27	4
448	1728
128	20 (86 $\frac{2}{5}$
1728	

6 If you will multiply one broken number by many broken numbers thus: As to multiply $\frac{2}{3}$ by $\frac{5}{7}$ and by $\frac{4}{9}$ you must multiply the Numerators of all the Fractions the one by the other, and of the Product make the Numerator, that is to say,

say, 2 by 5, and they be 10, then 10 by [illegible] and they be 40 for the Numerator. Likewise you must multiply the denominators the one by the other, that is to say, 3 by 7 maketh 21, then 21 by 9 maketh 189 for the Denominator: then set 40 over 189 with a line between them, and they make $\frac{40}{189}$. And so much amounteth $\frac{2}{3}$ by multiplication of the $\frac{2}{3}$ multiplied by $\frac{5}{7}$ and $\frac{4}{9}$ as by example following. And thus is to be understood of all such like.



The 7 Chapter treateth of Division of broken Numbers.

NOte that in Division of broken numbers, you must set your divisor down first, and unto the left hand, and the dividend or number that is to be divided always toward the

hand. And then multiply crosse-wise, that is to say, the Numerator of your Divisor by the Denominator of the Dividend, and the Product shall be the Denominator, which afterwards shall be your Divisor, and likewise you must multiply the Denominator of your first number, that is to say, of your first Divisor by the Numerator of the Dividend, which afterwards shall be the Dividend, and that must be set ober the Crosse, and the Denominator under the Crosse, then divide the Numerator by the Denominator, if it may be divided, if not, you must abbreviate them as hereafter by examples shall more plainly appear.

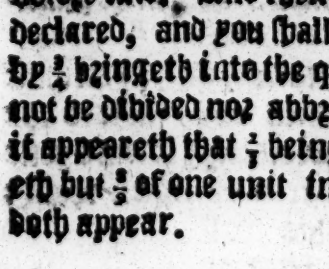
1 If you will divide $\frac{3}{4}$ by $\frac{2}{3}$ you must set the Divisor (which is $\frac{2}{3}$) next to the left hand, and the Dividend $\frac{3}{4}$ toward your right hand, with a crosse between them: as may appear by this example in the margent. Then you shall multiply the numerator of the $\frac{2}{3}$, which is 2 by the Denominator of the $\frac{3}{4}$ which is 4, and thereof commeth 8,

$$\frac{2}{3} \times \frac{3}{4} = \frac{9}{8}$$

which shall be your new Divisor: set

that

that 8 under the Crosse, as the Denominator: then multiply the numerator of the Dividend, that is to say of the $\frac{3}{4}$ which is 3 by the Denominator of the Divisor, that is to wit, of the $\frac{2}{3}$ which is 3 and thereof commeth 9, set the 9 ober the Crosse at the numerator: which shall be now the Dividend or number to be divided. Then finally you shall divide 9 by 8: and there commeth into the quotient $1\frac{1}{8}$, and so oftentimes is $\frac{2}{3}$ contained in $\frac{3}{4}$: as doth appear before in the margent. But in case you would divide $\frac{2}{3}$ by $\frac{3}{4}$. you must likewise in your divisor $\frac{3}{4}$ next to your left hand, as is before said. And then proceed as is above declared, and you shall find that $\frac{2}{3}$ divided by $\frac{3}{4}$ bringeth into the quotient $\frac{8}{9}$, which cannot be divided nor abbreviated. Wherefore it appeareth that $\frac{2}{3}$ being divided by $\frac{3}{4}$ bringeth but $\frac{8}{9}$ of one unit into the quotient, as doth appear.



2 Like-

2 Likewise if you will divide a broken number by a whole number, or else a whole number by a broken, as to divide $\frac{3}{4}$ by 13 you shall put 1 under 13, and it will be $\frac{13}{1}$ for your divisor, set that towards your left hand, and then multiply 13 by 4, according to the first division, and thereof will come 52 for the denominator, set that under the cross, and multiply 3 by one, maketh 3 for the numerator, set that over the cross, and it is $\frac{3}{52}$ as appeareth above.

$$\frac{13}{1} \times \frac{3}{4} \quad \begin{matrix} 3 \\ 52 \end{matrix}$$

But if you will divide 13 by $\frac{3}{4}$, then set the $\frac{3}{4}$ next your left hand, and put 1 under 13 as in the last example, and it is $\frac{13}{1}$, set that toward your right hand thus, as appeareth in the margent, and then work according to the doctrine of the first Division, and you shall find that 13 being divided by $\frac{3}{4}$ bringeth into the quotient $\frac{52}{3}$, then divide 52 by 3, and thereof commeth 17 $\frac{1}{3}$ and so oftentimes is $\frac{3}{4}$ contained in 13, as doth appear.

$$\frac{3}{4} \times \frac{13}{1} \quad \begin{matrix} 52 \\ 3 \end{matrix}$$

$$\begin{matrix} 21 \\ 52 \\ 33 \end{matrix} \left(17\tfrac{1}{3} \right.$$

3 And if you will divide whole numbers by whole numbers and broken, or else whole

whole number and broken by whole numbers, as to divide 20 by $5\frac{5}{6}$ you shall reduce $5\frac{5}{6}$ into broken, by the fifth reduction, and it maketh $\frac{35}{6}$ for your divisor, then put it under 20, & it will be $\frac{20}{1}$ then shall you multiply 35 by 1, and 20 by 6, as is taught in the other divisions, and you shall find $\frac{120}{35}$: then divide 120 by 35, and you shall find in your quotient 3, and $\frac{15}{35}$, the which $\frac{15}{35}$ being abbreviated, is $\frac{3}{7}$, and so many times is $5\frac{5}{6}$ contained in 20, as in the margent appeareth.

$$\frac{35}{6} \times \frac{20}{1}$$

120

35

1

35

120 (3 15/35

35

But if you will divide $5\frac{5}{6}$ by 20, you shall have $\frac{35}{120}$, then you must divide 35 by 120, which you cannot divide, wherefore you shall abbreviate $\frac{35}{120}$, and thereof cometh $\frac{2}{24}$ for your quotient.

4 If you will divide a broken number, by whole numbers and broken, or whole number and broken, by a broken number. As to divide $\frac{3}{4}$ by $13\frac{3}{5}$ you must reduce $13\frac{3}{5}$ into his broken, by the fifth reduction, and they be $\frac{41}{3}$ for your divisor, then multiply 41 by 4, and they be 164 for your denominator, likewise

ply 3 by 3, and they make 9 for the numerator, and then will your summe be $\frac{9}{164}$, as appeareth in the work here noted.

$$\begin{array}{c} 41 \\ 13\frac{2}{3} \end{array} \qquad \begin{array}{c} 9 \\ \frac{41}{3} \times \frac{3}{4} \\ 164 \end{array}$$

But if you will divide $13\frac{2}{3}$ by $\frac{3}{4}$ then you must divide 164 by 9, and you shall find $18\frac{2}{9}$.

5 If you will divide whole numbers and broken, by whole numbers and broken, as to divide $7\frac{3}{4}$ by $13\frac{2}{3}$ you must reduce the whole numbers into their broken, by the doctrine of the sixth reduction: & you shall find $\frac{31}{4}$ for the $7\frac{3}{4}$, and $\frac{41}{1}$ for the $13\frac{2}{3}$ Then set down $\frac{41}{3}$ toward the left hand, because it is your divisor, and the $\frac{31}{4}$ towards the right hand, and multiply 41 by 4, for your denominator: and thereof commeth 164, likewise multiply 31 by 3, for your numerator, and it amounteth to 93 the which will be thus, $\frac{93}{164}$ as before doth arpear.

$$\begin{array}{c} 93 \\ \frac{41}{3} \times \frac{31}{4} \\ 164 \end{array}$$

But if you will divide $13\frac{2}{3}$ by $7\frac{1}{4}$, you must

must (contrariwise to the other example) divide 164 by 93: and you shall find the quotient $1\frac{91}{93}$.

6 The broken numbers of broken numbers must be divided in such manner as broken numbers are, and there is no difference, being only that of divers and many: for broken numbers you must make but two broken numbers, that is to say, the one for the divisor, and the other for the dividend or number that is to be divided: example. If you will divide the $\frac{3}{4}$ of $\frac{3}{7}$ of $\frac{1}{2}$ by the $\frac{4}{7}$, you must understand that for the first, the $\frac{3}{4}$ of $\frac{3}{7}$ of $\frac{1}{2}$, are $\frac{9}{40}$ by the third reduction: and the $\frac{4}{7}$ of $\frac{4}{7}$, are by the same reduction $\frac{8}{21}$, then have you $\frac{8}{21}$ for your divisor, and $\frac{9}{40}$ for your number to be divided, then multiply 8 by 40, which maketh 320, set that under the cross, and multiply 9 by 21 and thereof commeth 189: which set over the cross for the numerator, and it make $\frac{189}{320}$ for his division, as doth appear.

$$\frac{8}{21} \times \begin{matrix} 189 \\ \hline 320 \end{matrix}$$

But if you would divide $\frac{8}{21}$ by $\frac{9}{40}$ you must work contrary to the last example, that is to say, you must divide 320 by 189 and thereof commeth in the quotient

CHAP.

CHAP. 8.

Treateth of Duplation, Triplation, Quadruplation of all broken numbers.

If you will double any broken number, you shall divide ye same by $\frac{1}{2}$: likewise if you will triple any fraction, you must divide it by $\frac{1}{3}$. And for to quadruple any broken number, you shall divide it by $\frac{1}{4}$ and so is to be understood of all other.

Example of Duplation.

If you will double $\frac{3}{2}$ you shall divide $\frac{3}{2}$ by $\frac{1}{2}$, and thereof commeth $\frac{6}{8}$, which being abbrevied, are $\frac{3}{4}$: as by example.

$$\frac{1}{2} \overset{6}{\underset{8}{\times}} \frac{3}{8}$$

Or otherwise, in case the denominator of any fraction be an even number, you may take half the said denominator, without any other operation, and the numerator to abide still the numerator, unto the said half of the denominator of the fraction, as by the other example before rehearsed, that is to say, of $\frac{1}{2}$ take $\frac{1}{2}$ of 8 which is 4: and that is

the denominator, and 3 remaineth still numerator to 4 and it maketh $\frac{3}{4}$, and so other. But in case the Denominator be odd number, that is to say, not even, you may multiply the numerator by 2, else double the numerator, which is one, & that fraction shall be doubled. ple, if you will double $\frac{3}{7}$, you must multiply the numerator 3 by 2, and the which maketh that fraction to be which 6 being divided by 5, bring and so much is the double of $\frac{3}{7}$.

Example of Triplation.

If you will triple $\frac{3}{7}$ you must divide $\frac{3}{7}$ & thereof commeth $\frac{9}{7}$ which being di bringeth $1\frac{2}{7}$, or otherwise, because the nominator is an odd number, you multiply the numerator 3 by 3, and the commeth 9, which maketh $\frac{9}{7}$, as before peared.

Example of Quadruplation.

If you will quadruple $\frac{4}{5}$ you shall $\frac{4}{5}$ by $\frac{4}{4}$, and thereof commeth $\frac{16}{5}$ which ing divided by 5 bringeth $3\frac{1}{5}$, or otherwise because the denominator of the fraction an odd number, you shall multiply merator of the $\frac{4}{5}$, that is to say, 4 by thereof commeth 16 : the which di

and you shall find $3\frac{1}{7}$ as before. And this serveth for Duplation, Triplation, and Quadruplation.

CHAP. 9.

Of the Proofs of broken Numbers, and first of Reduction.

IF you do abbreviate the broken numbers which be reduced, you shall return them into their first estate, as by example, if you reduce $\frac{2}{3}$ with $\frac{4}{7}$ you shall find $\frac{14}{17}$, and $\frac{12}{17}$, then abbreviate $\frac{10}{15}$ and you shall find $\frac{2}{3}$, abbreviate likewise $\frac{12}{15}$, and thereof commeth $\frac{4}{5}$ as before.

The Proof of Abbreviation.

IF you do multiply that number which you have abbreviated by that or those numbers by the which you have abbreviated them, you shall return them again into their first estate. Example, if you will abbreviate $\frac{32}{48}$ by 16, in taking the $\frac{1}{16}$ part both of the numerator and also of the denominator, you shall find $\frac{2}{3}$, the proof is thus, you must multiply both the numerator and denominator of $\frac{2}{3}$, that is to say, 2 by 16 maketh 48 for the denominator, and 2 by 16 maketh

32 for the numerator: then set the numerator 32, ouer the denominator 48, and they be $\frac{32}{48}$ as before.

If you do substract one of the numbers or many of them (which you haue added) from the total summe, there shall remain the other, or others: Example, if you adde $\frac{1}{3}$ with $\frac{1}{4}$, you shall find $\frac{7}{12}$. The proof is, if you substract $\frac{1}{3}$ from $\frac{7}{12}$, you shall find remainting the other number, which is $\frac{1}{4}$: or else if you do substract $\frac{1}{4}$ from $\frac{7}{12}$, there will remain the other number which is $\frac{1}{3}$.

The proof of Substraction.

If you do adde that number which remaineth, with the number which you did substract, you shall find the total summe, out of the which you made the abatement: or otherwise, if you do adde the two lesser numbers together, you shall find the greater. Example, if you substract $\frac{1}{4}$ from $\frac{7}{12}$, there will remain $\frac{1}{3}$. The proof is thus, you must adde $\frac{1}{12}$ & $\frac{1}{4}$ together, and you shall find $\frac{15}{48}$, the which being abbreuied, doth make $\frac{7}{12}$ which is the greatest number.

The proof of Multiplication.

If you deuide the product of the whole multiplication, by the multiplicator,

shall find in your quotient, the multiplicand or number the which you have multiplied, or else if you divide the total sum which is come of the multiplication by the multiplicand, you shall finde in the quotient the multiplicator. Example, If you multiply $\frac{2}{3}$ by $\frac{4}{7}$, the product of this multiplication will be $\frac{8}{21}$. The proof is thus, you shall divide $\frac{8}{21}$ by the multiplicator $\frac{4}{7}$, and thereof commeth $\frac{2}{3}$ which is y multiplicand: or else divide $\frac{8}{21}$ by $\frac{2}{3}$, and you shall find the $\frac{4}{7}$, which is the multiplicator.

The proof of Division.

If you do multiply the quotient by the divisor, you shall find the number which you did divide, that is to say, your dividend. Example, If you divide $\frac{2}{3}$ by $\frac{3}{4}$ your quotient will be $\frac{8}{9}$. The proof is thus, you must multiply $\frac{8}{9}$ by $\frac{3}{4}$, and thereof commeth $\frac{24}{36}$, which being abbreviated are $\frac{2}{3}$, which is your dividend, and by this manner all whole numbers have their proofs as well as broken numbers.

CHAP. 8.

Of certain questions done by broken numbers. And first by Reduction.

FInd two numbers, whereof ⅔ of the one number, may be equal unto the ⅜ of the other. And you shall reduce ⅔ and ⅜ cross-wise, you shall find 16 over the ⅔ and over the ⅜. which are the two numbers that you seek: for the ⅔ of 16 are 6, and so are the ⅜ of 21, likewise 6: wherefore you may perceive that the ⅔ of 16 which are 6, are equal unto the ⅜ of 21, which is also 6.

2 Find two numbers, whereof the ⅓ of the one, may be double unto ½ ¼ of the other. Answer. Double ¼, and you shall have ½, which being abbrevied is ½: then reduce ⅓ and ½ cross-wise, and you shall find 4 over the ⅓. and 3 over the ½, which are the two numbers that you seek, for the ⅓ of 3, which is 2, is double unto the ¼ of 4, which is but

3 Find two numbers whereof the ⅔ of the ¼ of the one, may be equal unto the ⅓ of the other. Answ. Adde the ⅔ and ⅓ together, and they make 7/12, then adde ¼ and ⅓ together, and they are 9/20, then reduce and 9/20 cross-wise, and you shall have

ober the $\frac{7}{12}$, and 108 ober the $\frac{9}{10}$ which are the two numbers that you seek. For 63 which are the $\frac{7}{12}$ of 108, are also the $\frac{9}{10}$ of 140.

4 Find two numbers whereof the $\frac{1}{3}$ the $\frac{1}{3}$ and the $\frac{1}{4}$ of the one of them, may be equal unto the $\frac{1}{5}$, $\frac{1}{6}$ $\frac{1}{7}$ of the other number? Anſ. First you muſt adde $\frac{1}{3}$ $\frac{1}{3}$, and $\frac{1}{4}$ together, and they make $\frac{13}{12}$, then adde $\frac{1}{5}$ $\frac{1}{6}$ and $\frac{1}{7}$ together, and they make $\frac{107}{210}$. Then reduce $\frac{13}{12}$ and $\frac{107}{210}$ croſs-wiſe, as by the firſt queſtion of reduction, and you ſhall find 2730 ober the $\frac{13}{12}$ and 1284 ober the $\frac{107}{210}$, which are the two numbers that you ſeek: for 1391 which is the $\frac{1}{3}$ the $\frac{1}{3}$ the $\frac{1}{4}$ of 1284: is like to the $\frac{1}{5}$ $\frac{1}{6}$, and $\frac{1}{7}$ of 2730 which is alſo 1391.

5 Find three numbers, whereof the $\frac{2}{7}$ of the firſt, the $\frac{3}{7}$ of the ſecond, and $\frac{4}{9}$ of the third, may be equal the one to the other. Anſwer. Set down the $\frac{2}{7}$ $\frac{3}{7}$, and $\frac{4}{9}$, and then multiply the Denominator of the $\frac{2}{7}$, that is to ſay, 5 by the Numerators of the other two Fractions, that is to ſay, by the numerator of $\frac{3}{7}$, and by the numerator of $\frac{4}{9}$, which is 3 and 4, and thereof commeth 60 for your firſt number: then ſhall you multiply the denominator of the $\frac{3}{7}$, which is 7 by the numerators of $\frac{2}{7}$ and $\frac{4}{9}$, that is to ſay, by 2 and 4, and thereof commeth 56, for the

second number. Then multiply the denominator of $\frac{4}{5}$, that is to say, 9 by the numerator of $\frac{2}{7}$ & $\frac{1}{7}$, that is by 2 & 3, and there commeth 54 for the third number, And the $\frac{2}{7}$ of 60, which is 24, is likewise the $\frac{4}{5}$ of 56, which is the second number, and is also the $\frac{4}{5}$ of 54, which is the third number.

6 Find three numbers of which the first and the second may be in such proportion as $\frac{1}{2}$ & $\frac{1}{3}$, & the second and third in such proportion as $\frac{1}{4}$ & $\frac{1}{5}$ Ans. Reduce $\frac{1}{2}$ and cross-wise, and you shall have 3 over the $\frac{1}{3}$ and 2 over the $\frac{1}{3}$, then reduce $\frac{1}{4}$ and $\frac{1}{5}$ in like manner, and you shall find 5 over the $\frac{1}{4}$, and 4 over the $\frac{1}{5}$. Then say by the Rule of Three, if 5 do give me 4, what shall give me, which is the second proportional: multiply the second number 4, by the third number 2, & thereof commeth 8, the which divide by the first number 5, and there commeth $1\frac{3}{5}$ for the third proportional: and you shall find that 3, 2, $1\frac{3}{5}$, are the three numbers proportional that I demand, or else 14 10, and 8, in whole numbers.

Questions done by Addition in Fractions.

What number is that, unto the which if you adde 13, the whole amounteth to 31? Answ. Substract 13 from

from 31, and there will remain 18, which is the number you seek.

2 What number is that, unto the which if you adde $\frac{2}{7}$, the addition will be $\frac{1}{2}$? Answ. Abate $\frac{2}{7}$ from $\frac{1}{2}$, and there will remain $\frac{3}{14}$, which is the number that you desire.

3 What number is that, whereunto if you adde $7\frac{2}{3}$, the whole addition will be $12\frac{1}{2}$? Answ. Abate $7\frac{2}{3}$ from $12\frac{1}{2}$, and the remain will be $4\frac{7}{12}$, which is the number that you desire to know.

4 What number is that, whereunto if you adde the $\frac{3}{4}$ of it self, that is to say, of the number that you seek, the whole addition may be $\frac{1}{2}$? Answ. Here followeth a general rule for all such like Questions. First of 3, which is the numerator of $\frac{3}{4}$: make that still the numerator: and likewise of 3 and 4 added together, which is both the numerator and the denominator, of the $\frac{3}{4}$ make them your denominator: so you shall find $\frac{3}{7}$ then take the $\frac{3}{7}$ of $\frac{1}{2}$, which is $\frac{3}{14}$ or $\frac{6}{14}$, and subtract them from $\frac{1}{2}$, and there will remain $\frac{2}{14}$ which is the number that you seek.

5 What number is that, unto the which if you adde his own $\frac{2}{3}$, that is to say, $\frac{2}{3}$ of it self, the whole addition shall be 20? Answ. Do as in the last question, of the numera-

tor

rator of $\frac{2}{3}$, that is to say of 2, make still numerator, and likewise of the numerator 2, and the denominator 3, of the $\frac{2}{3}$ make them both your denominator: and you find $\frac{3}{7}$, then take the $\frac{3}{7}$ of 20 which are and abate them from 20, and there will remain 12: which is the number that you desire. And so it is to be done of all such like reasons.

Questions done by Substraction in Fractions.

WHat number is that, from which if you do abate 17, the rest may be 19? Ans. Adde 17 and 19 together, and you shall find 37, which is the number that you seek.

2 What number is that, from the which if you abate $\frac{3}{7}$ the rest may be $\frac{1}{7}$? Adde $\frac{3}{7}$ and $\frac{1}{7}$ together, and you shall find which is the number that you demand.

3 What number is that, from the which if you reduct $13\frac{1}{2}$, the rest may be $5\frac{2}{7}$? Adde $13\frac{1}{2}$ and $5\frac{2}{7}$ together, & thereof cometh $19\frac{3}{14}$, which is the number you

4 What number is that, from the which if you substract his $\frac{2}{7}$, that is to say, $\frac{2}{7}$ of itself, the rest may be 12? Answer, by rule for such like reasons: that is to say, from the denominator of $\frac{2}{7}$ which is 7,

which is his numerator, and there resteth 1 for the denominator, and thus of $\frac{2}{7}$ you have now made $\frac{1}{7}$, then take the $\frac{2}{7}$ of 12 which are 8, and adde them unto 12, and thereof commeth 20, for the number which you desire.

5 What number is that, from the which if you do abate his $\frac{3}{4}$, the rest may be $\frac{2}{3}$? Answ. From the denominator of $\frac{3}{4}$ which is 4 subtract his numerator 3, and there resteth 1, thus of $\frac{3}{4}$ you have made $\frac{1}{1}$. Then multiply $\frac{1}{1}$ by $\frac{2}{3}$, and thereof commeth 2 $\frac{2}{3}$, the which adde unto $\frac{2}{3}$, and you shall have 3 $\frac{1}{3}$ which is the number that you seek.

6 What number is that, from the which if you do abate his $\frac{4}{7}$, the rest may be 12 $\frac{2}{3}$? Answ. Do as you did in the last question, and you shall find that the $\frac{4}{7}$ will be $\frac{4}{1}$. And therefore multiply 12 $\frac{2}{3}$ by $\frac{4}{1}$, and thereof commeth 50 $\frac{2}{3}$, the which adde upto 12 $\frac{2}{3}$, and you shall find 63 $\frac{1}{3}$, for the number that you demand, And thus of all such like Questions.

Questions of Multiplication in Fractions.

WHat number is that, which being multiplied by 13, the whole product of that multiplication shall make 221? Answ. Divide 221 by 13, and thereof commeth

commeth 17, which is the number that you seek.

2 What number is that, which being multiplied by 15, the whole multiplication will amount to $\frac{3}{4}$? Answ. Divide $\frac{3}{4}$ by 15, and thereof commeth $\frac{1}{20}$, which is the number that you seek.

3 What number is that, which being multiplied by 21, the whole multiplication will be $16\frac{4}{7}$? Ans. Divide $16\frac{4}{7}$ by 21, and you shall find $\frac{4}{7}$, and that is the number which you demand.

4 What number is that, which being multiplied by $\frac{3}{4}$, the multiplication will amount to 18? Ans. Divide $13\frac{1}{2}$ by $\frac{3}{4}$, and thereof commeth 24, which is the number that you desire to know.

5 What number is that, which if it be multiplied by $\frac{2}{3}$, the whole multiplication will be $\frac{1}{4}$? Ans. Divide $\frac{1}{4}$ by $\frac{2}{3}$ and the quotient will be $\frac{3}{8}$ which is the number that you require to know.

6 What number is that, which being multiplied by $\frac{5}{2}$, the product of the multiplication will be $16\frac{2}{3}$? Ans. Divide $16\frac{2}{3}$ by $\frac{5}{2}$, and thereof commeth $26\frac{2}{3}$, which is the number that you seek.

Here ensueth other necessary Questions which are wrought by Multiplication in broken numbers.

1 Demand how much the $\frac{5}{8}$ of 20 s. are worth, or what are the $\frac{5}{8}$ of 20 s? Answ. You must multiply $\frac{5}{8}$ by $\frac{20}{1}$, and the product will be $\frac{100}{8}$, therefore divide 100 by 8, and thereof commeth 12, which is to say, 12 s. 6 d. and so much are the $\frac{5}{8}$ of 20 s worth.

2 I demand what the $\frac{3}{4}$ of $\frac{5}{6}$ of a pound of money are worth, that is to say, of 20 s? Answ. Multiply $\frac{3}{4}$ by $\frac{5}{6}$ and thereof commeth $\frac{15}{24}$: Then take the $\frac{15}{24}$ of 20 s. as in the last Question going before, and you shall find 12 s. 6 d. and so much are the $\frac{3}{4}$ of $\frac{5}{6}$ of 20 s worth.

3 I demand what the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ are worth? Answ. Multiply $8\frac{1}{2}$ by $\frac{2}{3}$. or else $\frac{2}{3}$ by $8\frac{1}{2}$, which is all one, and you shall find $\frac{34}{6}$: Then divide 34 by 6, and your quotient will be 5 d. $\frac{4}{6}$, and so much are the $\frac{2}{3}$ of 8 d. $\frac{1}{2}$ worth.

4 What are the $\frac{3}{4}$ of 14 d. $\frac{3}{7}$? Answ. Multiply $14\frac{3}{7}$, by $\frac{3}{4}$ and thereof commeth $\frac{219}{28}$: Therefore divide 219 by 20, and your quotient will be 10 d. $\frac{19}{28}$, and so much are the $\frac{3}{4}$ of $14\frac{3}{7}$.

5 How many quarters or fourth
are contained in $7\frac{2}{3}$? Answ. Multip
by $\frac{4}{1}$ (because one whole containeth 4
ters) and thereof commeth $30\frac{2}{3}$, and
ny quarters are in the $7\frac{2}{3}$, that is
30 quarters, and $\frac{2}{3}$ of a quarter.

6 How many thirds are in $\frac{3}{4}$ and
is to say, in three quarters, and $\frac{1}{2}$
quarter or $\frac{1}{2}$: which are $\frac{7}{4}$ by the fift
on. Answ. Multiply $\frac{7}{4}$ by $\frac{3}{1}$ (for becau
in 1 whole are contained 3 thirds) c
ofcommeth $2\frac{1}{4}$ the which $2\frac{1}{4}$ do sign
$\frac{1}{3}$ of a third: and so many thirds
and $\frac{1}{2}$ or in $\frac{7}{4}$ which is all one.

Questions done by Division in broken numbers.

1 What number is that, which
divided by 17, the quotient will be
Answ. Multiply 17 by 13, and th
commeth 221, which is the number th
ſeek.

2 What number is that, which
divided by $\frac{3}{4}$, the quotient will be 21
Multiply $21\frac{1}{1}$ by $\frac{1}{4}$, and thereof commeth
Then divide 63 by 4, and thereof com
$15\frac{3}{4}$, which is the number that you ſeek.

3 What number is that, which
divided by $\frac{1}{5}$, the quotient will be

Multiply $\frac{2}{1}$ by $\frac{1}{2}$, and thereof commeth $\frac{2}{12}$: which being abbrebied are $\frac{1}{12}$ for the number which you require.

4 What number is that, which being dibided by $\frac{4}{7}$, the quotient will be $16\frac{1}{7}$? Answ. Multiply $16\frac{1}{7}$ by $\frac{7}{4}$, and thereof commeth $\frac{120}{28}$. Therefore dibide 200 by 15, and thereof commeth $13\frac{1}{3}$, which is the number that you desire to find.

5 What number is that, which being dibided by $13\frac{1}{3}$ the quotient will be 20? Answ. Multiply $\frac{20}{1}$ by $13\frac{1}{3}$, thereof commeth $\frac{800}{3}$ then dibide 800 by 3, and thereof commeth $266\frac{2}{3}$ for the number which you seek.

6 What number is that, which if it be dibided by $12\frac{1}{2}$ the quotient will be $\frac{7}{8}$? Ans. Multiply $12\frac{1}{2}$ by $\frac{7}{8}$, & thereof commeth $\frac{175}{16}$, then dibide 175 by 16, and thereof commeth $10\frac{15}{16}$ for the number which you desire.

Other necessary questions done by Division in broken numbers.

1 Demand what part 30 is of 70? Answ. Dibide 30 by 70, which you cannot, for they are $\frac{30}{70}$, but abbreby them, and they are thus 30 are the $\frac{3}{7}$ of 70.

2 I demand what part 10 is of $16\frac{2}{3}$? Answ. Dibide $\frac{10}{1}$ by $16\frac{2}{3}$, and thereof com-

meth $\frac{10}{120}$, which being abbrebied are $\frac{1}{12}$. And thus 10 is found to be $\frac{1}{12}$ of $16\frac{2}{3}$.

3 Woze, $\frac{5}{8}$ of one unit, what part are they of 25? Anſ. Divide $\frac{5}{8}$ by $25\frac{1}{1}$ and there of commeth $\frac{5}{200}$, which being abbrebied is $\frac{1}{40}$ and thus $\frac{1}{40}$ of 1, is but the $\frac{1}{40}$ of 25.

4 Woze, $\frac{1}{6}$ what part are they of $\frac{7}{8}$? Anſ. Divide $\frac{1}{6}$ by $\frac{7}{8}$, and you ſhall finde $\frac{8}{42}$ which abbrebied are $\frac{4}{21}$.

5 Woze, $\frac{4}{5}$ of 1, what part are they of $13\frac{1}{3}$? Anſ. Divide $\frac{4}{5}$ by $13\frac{1}{3}$, and you ſhall find $\frac{12}{200}$, which being abbrebied are $\frac{3}{50}$. And thus $\frac{4}{5}$ of 1, are the $\frac{3}{50}$ of $13\frac{1}{3}$.

6 Woze, $12\frac{1}{2}$, what part are they of 30? Anſ. Divide $12\frac{1}{2}$ by $30\frac{1}{1}$, and you ſhall find $\frac{25}{60}$ which being abbrebied are $\frac{5}{12}$. and thus $12\frac{1}{2}$, are the $\frac{5}{12}$ of 30.

7 Woze, $16\frac{2}{3}$ what part are they of $57\frac{1}{7}$? Anſw. Divide $16\frac{2}{3}$ by $57\frac{1}{7}$, and there of commeth $\frac{350}{1200}$ which being abbrebied are $\frac{7}{24}$: and thus $16\frac{2}{3}$ are the $\frac{7}{24}$ of $57\frac{1}{7}$.

8 Woze, $\frac{3}{4}$ & $\frac{2}{3}$ of $\frac{1}{4}$, or 3 quarters, and $\frac{2}{3}$ of one quarter, what part are they of 1? Anſ. reduce $\frac{3}{4}$ & the $\frac{2}{3}$ of $\frac{1}{4}$ into one broken number by the 5 reduction, and you ſhal find $\frac{11}{12}$. And thus the $\frac{3}{4}$ $\frac{2}{3}$, of $\frac{1}{4}$ are the $\frac{11}{12}$ of 1 whole.

9 Woze, of what number are 9 the $\frac{2}{3}$? Anſ. Divide 9 by $\frac{2}{3}$ & thereof commeth 13$\frac{1}{2}$ which is the number whereof 9 are the

10 Woze

10 Woze, of what number are $\frac{2}{7}$ the $\frac{3}{5}$? Answ. Divide $\frac{2}{7}$ by $\frac{3}{4}$ and thereof cometh $\frac{8}{21}$ which is the number whereof $\frac{2}{7}$ are the $\frac{3}{4}$ of the same number.

11 Woze, of what number are $5\frac{3}{4}$ the $\frac{1}{3}$? Answ. Divide $5\frac{3}{4}$ by $\frac{1}{3}$ and you shal find $17\frac{5}{12}$, which is the number whereof $5\frac{3}{4}$ are the $\frac{1}{3}$.

12. Woze, $9\frac{2}{3}$ what part are they of $33\frac{1}{3}$? Answ. Divide $9\frac{2}{3}$ by $33\frac{1}{3}$, and thereof cometh $\frac{58}{201}$. and thus $9\frac{2}{3}$ are the $\frac{58}{201}$ of $33\frac{1}{3}$ as appeareth.

The third part treateth of certain brief Rules called Rules of Practise, with divers necessary Questions: profitable not only for Merchants, but also for all other Occupiers.

CHAP. I.

SOme there bee, which doe call these Rules of practise, brief Rules: for that by them, many Questions may bee done with quicker expedition, than by the rule of Three. There be others which call them the small multiplication, for because that the product is always lesse in quantity than the number which is to bee multiplied. This practice cometh not in use, but only amongst small kinds of numbers, which have ober them other numbers that are greater. And this being well considered, is no other thing but to convert lesser, and particular kinds of numbers into greater: the which may be done by the means of division, in taking the half, the third, the fourth, the fifth, or such other parts of the summe, which is to be multiplied, as the multiplier is part of his greater kind, and that which commeth thereof, is worth

much (not in quantity, but in his owne forme and quality) as if you did multiply simply the two sums, the one by the other. And for the better understanding of such conversions, you must have respect to one of these two considerations: the first is, when one would demand this Question, At 6 d. the yard of Cotten, what are 18 yards worth by the piece? it is manifest that they are worth 18 pieces of 6 pence the piece, or 18 half shillings, which must be turned into shillings in taking the half of 18 s. and they make 9 s: Or otherwise you must consider that at 1 s. the yard, the 18 yards are worth 18 s. Therefore at 6 d. they shall be but half so much, for 6 d. is but the $\frac{1}{2}$ of 1 s. Therefore you must take the $\frac{1}{2}$ of 18 s. and they make 9 s. which are worth as much as 108 d. that is to say, as 18 times 6 pence.

Rule. *An Aliquot part is an even part of a shilling, or of a pound, of any other thing, as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c are called aliquot parts.*

First, if you will multiply any number after this manner by pence, whereof the number of the same pence doe not extend unto 12, and thereof to bring shillings into the product: you must know the aliquot parts of 12, which are these: that is to say, 6, 4, 3, 2, & 1. For 6 is the $\frac{1}{2}$ of 12, 4 is the $\frac{1}{3}$ of 12, 3 is the $\frac{1}{4}$, 2 is the $\frac{1}{6}$ & 1 is the $\frac{1}{12}$. Then for 6 d. which is the half of 1 s.

you must take the $\frac{1}{2}$ of all the number which is to be multiplied: and that which comes thereof shall be shillings: if there doe remain 1, it is 6 pence.

For 4 pence, you must take the $\frac{1}{3}$ of all the number that is to be multiplied: and if any unites do remain, they shall be thirds of a shilling, every one being in value 4 d.

For 3 pence you must take the $\frac{1}{4}$ of all the summe: if any units doe remain they shall be fourths of a shilling, every one being worth 3 pence.

For 2 pence you must take the $\frac{1}{6}$ of all the sum, and if any units doe remain, they shall be 6 parts of a shilling, being every one of them worth 2 pence.

For 1 peny take the $\frac{1}{12}$ of the whole sum, if any units doe remain, they are the twelfth part of a shilling, each of them being in value 1 d. as by these examples following doth plainly appear.

Example I.

At 6 pence the yard.
What are 59 yards worth?

29 shil. 6 pence.

II.

At 4 pence the yard,
What are 82 yards?

27 shil. 4 pence.

III.

At 3 pence the yard,
What 97 yards?

24 shil. 3 pence.

IV.

At 2 pence the yard,
What 346 yards?

57 shil. 8 pence.

V.

At 1 peny the yard,
What 343 yards?

28 shil. 7 pence.

Here you may see in the first example, that 59 yards at 6 d. the yard, are worth 29 s. 6 d. in taking the $\frac{1}{2}$ of 59.

And in the second example, the 82 yards at 4 d. the yard, are worth 27 s. 4 d. in taking the $\frac{1}{3}$ of 82.

Likewise in the third example, 97 yards at 3 d. the yard bringeth 24 s. 3 d. in taking the $\frac{1}{4}$ of 97.

Alſo in the fourth example 346 yards, at 2 d. the yard, maketh 57 s. 8 d. in taking the $\frac{2}{6}$ of 346.

And finally, in the Fifth example, 343 yards at 1 d. the yard amounts to 28 s. 7 d. in taking the $\frac{1}{12}$ of 343. And ſo is to be done of all ſuch like, when the number of the pence is any of the aliquot parts of 12.

But if the number of the pence be not an aliquot part of 12, you muſt reduce them into ſome aliquot parts of 12: and after the aforeſaid manner, you ſhall make of them two or three products as need ſhall require, and adde them together into one ſum; as 5 d. may be reduced into 4 d. and 1 d. or elſe into 3. and 2 d. For 4 d. and 1 d. doe make 5 d. and ſo doe 3 d. and 2 d. the like. Wherefore if you will worke by 4, and by 1: you muſt for 4 d. take firſt the $\frac{1}{3}$ of the number that is to be multiplied, and for 1 d. take the $\frac{1}{12}$ of the whole ſum, or rather for 1 d. ye may take the $\frac{1}{4}$ of the product, which did come of the 4 d. becauſe that 1 d. is the $\frac{1}{4}$ of 4 d. But if you will worke by 3 d. and 2 d. you ſhall take for 3 d. the $\frac{1}{4}$ of the number which is to be multiplied: and likewiſe for 2 d. the $\frac{1}{6}$ of the ſame number, adding together both the products: The total ſum of theſe two numbers ſhall be

the

the solution to the question. And in like manner is to be done of all others.

As by these examples following may appear:

Example I.

At 5 pence the yard.
What will 49 yards amount unto?

16 shil. 4 d.
4 shil. 1 d.

20 shil. 5 d.

II.

At 7 d. the lib.
What will 54 lib. cost?

18 shil. 0 d.
13 shil. 6 d.

31 shil. 6 d.

III.

At 8 pence the piece,
What are 40 worth?

13 shil. 4 pence.
13 shil. 4 pence.

26 shil. 8 pence,

Other wayes.

At 8 pence the piece,
What are 40 pieces worth?

20 shil.
6 shil. 8 d.

26 shil. 8 d.

IV.

At 9 pence the yard,
What are 73 yards?

39 shil. 6 d.
18 shil. 3 d.

57 shil. 9 d.

V.

At ten pence the ell.
What are 32 Ells?

16 shil. 0 d.
10 shil. 8 d.

26 shil. 8 d.

VI.

At 11 d. the lib.
What are 27 lib?

9 shil. 0.
9 shil. 0.
6 shil. 9.

24 shil. 9 d.

here in this first example, where it is demanded (at 5 pence the yard) what will 49 yards amount unto? First, for 4 d. I take the $\frac{1}{3}$ of 49 s. and thereof cometh 16 s. 4 d. then for 1 d. I take the $\frac{1}{4}$ of the same product, that is to say, of 16 s. 4 d. and that bringeth 4 s. 1 d. these two sums added together do make 20 s. 5 d. And so much are the 49 yards worth at 5 the yard.

For 7 d. take the $\frac{1}{3}$ and the $\frac{1}{4}$ of the whole summe which is to bee multiplied, and adde them together, that is to say, for 4 d. you must take the $\frac{1}{3}$: and for 3 d. the $\frac{1}{4}$ because 4 d. is the $\frac{1}{3}$ of 12 d. and 3 d. is the $\frac{1}{4}$ as in the second example before doth appear, where the question is thus, at 7 d. the l. what will 54 l. cost? First, for 4 d. I take the $\frac{1}{3}$ of 54, and they make 18 s. Likewise for 3 d. I take $\frac{1}{4}$ of 54, and they are 13 s. 6 d. Then I adde 18 s. and 13 s. 6 d. together, so both amount to 31 s. 6 d. and so much are the 54 l. at 7 d. the l.

Otherwise for 7 d. you shall first take the $\frac{1}{3}$ of the whole sum for 6 d. Then for 1 d. you must take the $\frac{1}{6}$ of the same product and adde them together, so you shall have the like sum as before.

For 8 d. you must first take $\frac{1}{2}$ of the whole summe for 4 d; and another $\frac{1}{2}$ for

other

other 4d. and adde them together, as in the example doth evidently appear. Where the question is thus, at 8 d. the piece, what are 40 pieces worth? First, for 4 d. I take the $\frac{1}{3}$ of 40 which is 13 s. 4 d. Again, I take another $\frac{1}{3}$ for the other 4 d. which is also 13 s. and 4 d. These two sums being added together, doe make 29 s. 8 d. and so much are the 40 pieces worth, at 8 d. the piece: as in the third example abovesaid doth appear.

Otherwise for 8 d. you may take first the $\frac{1}{2}$ of the whole summe for 6 d. Then for 2 d. you shall take the $\frac{1}{3}$ of the product, which did come of the said $\frac{1}{2}$ and adde them together: so shall you have likewise the solution to the question. As in the same third example of 40 yards: I take first the $\frac{1}{2}$ of 40 for 6 d. and thereof cometh 20. s. then for 2 d. I take $\frac{1}{3}$ of the said product, that is to say of 20 s. which bringeth 6 s. 8 d. these two summes (20 s. and 6 s. 8 d.) I adde together, and they make 26. s. 8 d. as before.

For 9 d. you must take the $\frac{1}{2}$, and the $\frac{1}{4}$ of the whole summe, and adde them together, for else for 6 d. take first $\frac{1}{2}$ of the whole summe, then for 3 d. take $\frac{1}{2}$ of the same product, because 3 d. is the half of 6 d. And 6. d. added with 3 d. bringeth 9 d. as by the fourth

fourth example where it is demanded after this sort, at 9 d. the yard, what are 73 yards worth? First for 6 d. I take the $\frac{1}{2}$ of 73, and thereof cometh 36 s. 6 d. then for 3 d. I take $\frac{1}{2}$ of the same 36 s. 6 d. which is 18 s. 3 d. these two summes I adde together, and they make 54 s. 9 d. as in the said fourth example is evident.

For 10 d. take first the $\frac{1}{2}$, then the $\frac{1}{3}$ of the whole summe, and adde them together, and it is done.

For 11 d. take first $\frac{1}{3}$ for 4 d. secondly, another $\frac{1}{3}$ for other 4 d. and thirdly $\frac{1}{4}$ for 3 d. (of all the whole summe) and adde them together, and that answereth the question.

Or else for 11 d. take first the $\frac{1}{2}$ for 6 d. then the $\frac{2}{3}$ of the whole summe for 4 d. and finally, the $\frac{1}{4}$ of the last product for 1 d. adding them together, and it will bee like to the other.

Likewise by the same reason, when you will multiply (by shillings) and any number that is under 20 s. you shall have in the product pounds, if you know the aliquot parts of 20, which are these: 10, 5, 4, 2, & 1. For 10 is $\frac{1}{2}$ of 20. 5. is the $\frac{1}{4}$ part, 4 is the $\frac{1}{5}$, 2 is the $\frac{1}{10}$ and 1 is the $\frac{1}{20}$. Rule 3.

Then for 10 s. which is the $\frac{1}{2}$ of a pound, you must take the $\frac{1}{2}$ of that number, which is

to

to be multiplied, and you shall have p... in the product. If there doe remain, ... shall be worth 10 s.

For 5 s. you must take the $\frac{1}{4}$ of the ... ber which is to be multiplied, and if there ... remain any units, they shall be fourth p... of a pound, every unit being in value 5 s.

For 4 s. you must take $\frac{1}{5}$ of the ... which is to be multiplied: And if there ... remain any units, they shall be fift part ... a pound, every unit being worth 4. s.

Example.

At 10 shil. the piece,
What are 75 pieces worth?

37 lib. 10 shil.

At 5 shil. the yard,
What are 89 yards worth?

22 lib. 5. shil.

At 4 shil. the Ell,
What are 93 Ells worth?

18 lib. 12 shil.

For 2 s. you must take the $\frac{1}{10}$ of the number that is to bee multiplied. ...

saye if you wil take the $\frac{1}{10}$ of any number, you must separate the last figure of the same number (which is nearest your right hand) from all the other figures, with a small broke or dash with a pen. For all the other figures which do remain towards your left hand from the same figure that you do separate, shall be the said $\frac{1}{10}$ of a pound; and that figure so separated toward your right hand, shall be so many pieces of 2 s. the piece, the which figure must be doubled to make thereof shillings, as by these examples appeareth.

At 2 shil. the lib.
What are 9.8 lib. worth?

9 lib. 16 shil.

At 2 shil. the dozen,
What are 40.3 dozens worth?

40 lib. 6 shil.

Hereupon dependeth another exact way, for to multiply by shillings (if the number of shillings bee eben) which is thus: you shall take $\frac{1}{2}$ of the number of the same shillings, and convert them into pieces of 2 shillings. Then by the number of this half, you must first multiply the last figure, toward

ward your right hand) of the number which is to be multiplied. And if there be any tens in the same product, those must you reserve in your mind: But (if with the same, or else without the same) you doe finde any digit number, the same digit number shall you double, and put it into the place of shillings. Then must you proceed to the multiplication of the other figures, adding unto the product, the tens which you before reserved: and thereof shall come pounds.

Now for your better understanding of this which hath been said, and by the way of example, I will propound unto you this question.

At 8 s. the grosse, what are 97 grosse worth after the rate?

First, in this example I take half the number of shil. as before is taught, that is to say, of 8 shillings, which is 4 shillings: this 4 shillings I put apart behind a crooked line, right against 97 towards the left hand, as here you may see, and as hereafter appeareth by divers examples.

At 8 shil. the grosse,
4) What will 97 grosse cost?

38 lib. 16 shil.

At 6 shil. the yard,
3) What 919

29 lib. 14 shil.
At 12 shil.
6) What 3415?

1207 lib. 0 shil.
At 14 shil.
7) What 2110?

147 lib. 0 shil.

Now in the first example, where it is demanded at 8 s. the grosse, what are 97 grosse? First, the ½ of 8 s. which is 4 s. being set apart behind the crooked line, as before is said: then I multiply the 97 by 4, saying first, 4 times 7 is 28. I double the digit number 8, and that maketh 16, the which 16, I doe put under the line, in the place of shillings, and I keep the two tens in my mind, which here in worke doe represent 2 l. Then secondly, I multiply 9. by the said 4, and thereof cometh 36. whereunto I adde the 2 l. which before I did reserve, and they make 38. Therefore I put 38, under the line in the place of pounds, and the whole sum will be 381. 16 s. Thus much are the 97 grosse worth, at 8 s. the grosse: the like is to be done of all other.

As

As of 12 s. in multiplying by 6. Like wise of 6 s. if you multiply by 3: also of 14, if you multiply by 7. And so of all even numbers after the same manner.

For 1 s. you must take the $\frac{1}{2}$ of the $\frac{1}{10}$ part, of any number that is to be multiplied.

At 1 shil.
What 150?

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17 lib. 10 shil.

And if any thing doth remain they are shillings. Thus by this manner shil. are converted into pounds: for it is even like as though you did divide them by 20 shil. as by this example abobesaid doth appear. Where it is demanded at 1 s. the yard, the piece or any other thing, what are 350 yards or pieces worth.

First, I separate the last figure of 350 next to my right hand, which is the 0, with a line between it and the figure 5: then I make a line under the 3 5 | 0, and I take the $\frac{1}{2}$ of 35, after this manner; saying the $\frac{1}{2}$ of 3 is 1, and 1 remaineth, which remain signifieth 10, in that second place: then I put 1 under the line against 3, and I proceed to the rest, saying the half of 15 s. is 7. (the which 15 came of the 1 that remained, and of the 5 in the 1 place.) I put 7 un-

the line, right against 5, and they make 1. The 1 which did last remain is 10 s. which I put 10 s. apart under the line, and the whole sum is 17 l. 10 s. so much are 685 worth at 1 s. the piece.

But when the number of shillings is not some aliquot part of 20 s. you must then convert the same number of shillings, into the aliquot parts of 20, and make two or three products as need shall require, the which must be added together after this manner following.

For 3 shillings, you must first take for 2 s. the $\frac{1}{10}$ of the number that is to be multiplied, then for 1 shilling, you must take the $\frac{1}{20}$ of the product which did come of the $\frac{1}{10}$ part: and adde these two summes together, as appeareth by this example following.

At 3 s. the piece of any thing, what shall 684 pieces cost me after the rate? First, for 2 shillings I take the $\frac{1}{10}$ of 684, which is 68, in separating the last figure 4 which I must double, and keep 8: I set 8 s. apart from the place of pounds, and then I have 68 pounds 8 s. for the $\frac{1}{10}$ that is to say, for the 2 s. Secondly,

At 3 shil. What 684?
6 lib. 8 shil.
34 lib. 4 shil.
100 lib. 12 shil.

for 1 s. I take the ½ of the product, that is to say, of 68 l. 8 s. which is 34 l. 4 s. and set the same under the 68 l. 8 s. Then I adde those two sums together, that is to say, 68 l. 8 s. and 34 l. 4 s. so they make 102 l. 12 s. and so much are the 68 l. worth at 3 s. the piece, as may appear in the preceding margent.

For 6 s. take $\frac{1}{10}$ of the number which is to be multiplied: that is to say, take first, then double the product of the same, and adde them together. Or otherwise you may take first the $\frac{1}{2}$ of the number that is to be multiplied, then for 2 s. take $\frac{1}{3}$ of the product, and adde them together.

Or else take for 5 s. the $\frac{1}{2}$ of the whole sum, then for 1 s. take the $\frac{1}{5}$ of the product, and adde them together.

Likewise for 7 s. take first for 5 s. the $\frac{1}{2}$, then for 2 s. take the $\frac{1}{10}$ of the number which is to be multiplied, and adde them together.

For 8 s. take the $\frac{1}{2}$ at two sundry times, that is to say, first $\frac{1}{2}$ for 4 s. & then as much more for other 4 s. and adde them together.

For 9 s. take first the $\frac{1}{2}$ and likewise the $\frac{1}{10}$ of the number that is to bee multiplied, and adde them together.

For 11 s. take first the $\frac{1}{2}$ for 10 s.

for 1 s. take the $\frac{1}{10}$ of the product, and adde them together, or else for 5 s. take the $\frac{1}{4}$; then for 4 s. take the $\frac{1}{5}$, and lastly for 2 s. take the $\frac{1}{2}$ of the last product, and adde them together.

For 12 s. take first the $\frac{1}{2}$ for 10 s. then for 1 s. take the $\frac{1}{5}$ part of the product, and adde them together.

For 13 s. take the $\frac{1}{2}$ then the $\frac{1}{5}$ and again another $\frac{1}{5}$ of the number which is to be multiplied, and adde the products together, that is to say, first for 5 s. take the $\frac{1}{4}$, then for 4 s. take the $\frac{1}{5}$. And again another $\frac{1}{5}$ for the other 4 s. and adde the 3 products together. The like is to be done in all others when the price of the thing which is valued is only of shillings, as by these examples following doth plainly appear.

At 6 shil.

What 67?

13 lib.	8 shil.
6	14
20 lib.	2 shil.

At 7 shil.

What 347?

86	15
34	12
121 lib.	9 shil.

At 8 shil.
What 540?

108 lib. 0 shil.
108 0 shil.

216 lib. 0 shil.

At 9 shil.
What 230?

57 10
46 00

103 lib. 10 shil.

At 11 shil.
What 159?

79 10
7 19

87 lib. 9 shil.

At 12 shil.
What 349?

174 10
34 18

209 lib. 8 shil.

At 13 shil.
What 267?

66 15
53 8

172 lib. 11 shil.

Likewise in multiplying by pence, you shall have (at the first instant) pounds in the product, in case you know the aliquot parts of $\frac{1}{10}$ of a pound, or of 24 d. which are these, 12, 8, 6, 4, 3, and 2. For 12 is the $\frac{1}{2}$ of 24: 8 is the $\frac{1}{3}$: 6 is the $\frac{1}{4}$: 4 is the $\frac{1}{6}$: 3 is the $\frac{1}{8}$: and 2 is the $\frac{1}{12}$: but for 12 d. which is 1 s. I have before made mention thereof.

For 8 d. you must take the $\frac{1}{3}$ of the $\frac{1}{10}$, and the rest which are the pieces of 8 d. must be doubled to make of them pieces of 4 d. And of the same number being doubled, you must take the $\frac{1}{3}$ which will be shillings, and if there do yet remain any thing, they are thirds of a shilling, being in value 4 d. the piece.

For 6 d. take the $\frac{2}{5}$ of the $\frac{1}{10}$, and of that remaineth, you must take the $\frac{1}{3}$ which shall be shillings, if there do yet remain 1, it shall be in value 6 d.

For 4 d. you must take the $\frac{1}{6}$ of the $\frac{1}{10}$ and of that which resteth take the $\frac{1}{3}$ to make thereof shillings: if any thing do yet remain, they are thirds of a shilling, being in value 4 pence the piece.

For 3 pence take the $\frac{1}{8}$ of the $\frac{1}{10}$ and of that remaineth, take $\frac{1}{4}$, to make of them shillings: if any thing do yet remain,

they are fourths of a shilling, every one of them being worth 3 d.

For 2 d. take the $\frac{1}{12}$ of the $\frac{1}{12}$: and of that which resteth, take $\frac{1}{3}$. the which are shillings, if there do still remain any thing, they shall be fix parts of a shil. every one being in value 2 d.

For 1 d. you shall understand that it is not possible with ease, to bring of d. pounds (into the product) upon the total summe: But first, you must bring them into shil. by the order of the second Rule of this Chapter, and then afterward you shall convert them into pounds, if need so require, as by these examples following may appear.

At 8 d.

What 59 16?

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19 lib. 17 shil 4 d.

At 6 d.

What 67 8?

$\frac{1}{20}$ 16 lib. 19 shil.

At 4 d.

What 93 4?

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15 lib. 11 shil. 4 d.

At 3 d.

What 57 11?

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7 lib. 2 shil. 9 d.

At

At 2 d.
What 36 l 4 ?

3 lib. 0 shil. 8 d.

At 1 d.
What 67 l 6 ?

5 lib. 11 shil. 8 d.
2 lib. 16 shil. 4 d.

But if the number of pence, be not an aliquot part of 24 pence, then must you bring them into the aliquot parts of 24, and make thereof divers products, which must be added together, as shall hereafter appear.

For 5 d. you shall first take for 3 d. then for 2 d. and adde them together, according to the instruction of the last Rule. Or else, first take for 4 d. and then for 1 d.

For 7 d. first take for 4 d. then for 3 d. and adde them together.

For 9 d. take first for 6 d. then for 3 d. adding them together.

For 10 d. first take for 6 d. then for 4 d and adde them together.

For 11 d. take first for 8 d. then for 3 d. and adde them together; as by these examples following doth appear.

At 5 d.

What 92 17 ?

11	11	9
7	14	6

19 lib. 6 shil. 3 d.

At 7 d.

What 5 12 ?

8	10	8
6	8	0

14 lib. 18 shil. 8 d.

At 9 d.

What 54 6 ?

13	13	0
6	16	6

20 lib. 9 shil. 6 d.

At 10 d.

What 27 13 ?

6	16	6
4	11	0

11 lib. 7 shil. 6 d.

At 11 d.

What 26 12 ?

8	16	0
3	6	0

12 lib. 2 shil. 0 d.

If you will multiply any number by

lings and pence being both together, you must take first for the s. according to the instruction of the third Rule of this first Chapter, then take for the d. after the order of the fifth Rule before mentioned: but if there be any aliquot parts of 1 l. containing both shil. and pence, then for those parts you shall take such like part of the number that is to bee multiplied as the number is part of 1 l. the which aliquot parts are these, 6 s. 8 d. 3 s. 4 d. 2 s. 6 d. and 1 s. 8 d. for 6 s. 8 d. is the $\frac{1}{3}$ of a l. 3 s. 4 d. is the $\frac{1}{6}$ of a l. 2 s. 6 d. is the $\frac{1}{8}$ and 1 s. 8 d. is the $\frac{1}{12}$ of a pound, or of 20 s. And therefore for 6 s. 8 d. you must take the $\frac{1}{3}$ of the number that is to be multiplied: and if any thing do remain, they are thirds of a l. every one being worth 6 s. 8 d.

For 3 s. 4 d. you must take the $\frac{1}{6}$ of the number which is to be multiplied, and if any thing doe remain they are 6 parts of a l. every one being in value 3 s. 4 d.

For 2 s. 6 d. you must take the $\frac{1}{8}$: if any thing be remaining they are 8 parts of a l. each one being worth 2 s. 6 d.

For 1 s. 8 d. you shall take the $\frac{1}{12}$, the number that is to be multiplied, and if there be any thing remain, they are twelve parts of a l. every one being in value 1 s. 8 d.

At

At 6 shil. 8 d.
What 647?

215 lib. 13 shil. 4 d.
At 3 shil. 4 d.
What 220?

36 lib. 13 shil. 4. d.
At 2 shil. 6 d.
What 47?

5 lib. 17 shil. 6 p.
At 1 shil. 8 d.
What 400?

33 lib. 6 shil. 8 d.

ple7. Here shall you accustome your self to multiply by all sorts of sums, being composed of shillings, and pence, which may come in use of practice. As thus, for 1 s. 1 d. for 1 s. 2. d: 1 s 3 d: for 1 s. 4 d: Likewise for 2 s. 1 d. 2 s. 2 d. 2 s. 3 d. 2 s. 4. d. And so of all other, considering moreover, many subtile abbreviations, which happen oftentimes, that are easie to be conceived. As thus 11 s. 3 d. after that I have taken first the $\frac{1}{2}$ for 10 s. Then for 1 s. 3 d. I take the $\frac{1}{5}$ of the product, because 1 s 3 d. is the $\frac{1}{4}$ of 10 s. in taking the said $\frac{1}{4}$ of the product. And by this means, when yee have taken one product, yee may oftentimes upon the same

same take another more briefly than upon the summe that is to be multiplied, which thing you must forsake.

At 11 shil. 3 d.
What 53?

26	10	0
3	6	3

29 lib. 16 shil. 3 d.

At 6 shil. 3 d.
What 58?

14	10	0
3	12	6

18 lib. 2 shil. 6 d.

At 12 shil. 8 d.
What 64?

32	0	8
6	8	0
2	2	8

40 lib. 10 shil. 8 d.

But if you will multiply by pounds, shillings, and pence, being altogether, first, you must wholly multiply by pounds: then take for the shillings and pence, as in the 6 Rule of this Chapter is plainly declared. And as by examples following may appear.

At

At 3 lib. 6 shil. 8 d.
What 49?

147	0.	0
16	6	8
163 lib. 6 s. 8 d.		

At 5 lib. 18 shil 4 d.
What 543?

2715	0	0
271	10	0
135	15	0
90	10	0
3212 lib. 15 shil 0 d.		

At 2 lib. 7 shil 4 d.
What 927?

1854	0	0
185	8	0
154	10	0
2193 lib. 18 shil. 0 d.		

So these Rules do serve both to buy and sell. As at such a price the ell, the yard, the piece, the pound weight, or any other thing: how much is such a thing, or so many ells worth? Likewise they are very necessary to convert all pieces of gold and silver into pounds: for I may as well say 4 s. 8 d. the French crown, what are [illegible] crowns

crowns worth, as to say, at 4 s. 8 d. the yard of cloath, what are 135 yards worth.

When any one of the sums which is to be multiplied, is composed of many denominations: and the other being of one figure alone: then shall ye multiply all the denominations of the other summe by the same one figure, beginning first with that sum which is least in value towards your right hand, and bring the product of those pence into shillings, and the product of the shillings into pounds, as by this example doth appear. Rule 10

At 3 lib. 9 shil. 8 d. the piece.
What 7?

---

24 lib. 7 shil. 8 d.

But (if any of the numbers which are to be multiplied) there be with it a broken number, you must (according to his denominator) take one or many parts of the other number, as need doth require, and set the number which cometh thereof under the products, adding the same together. As thus: At 5 l. 7 s. 8 d. the gross, what shall 34 gross, $\frac{1}{2}$ cost? first you shall multiply 5 li. 7 s. 8 d. by 34 gross, saying 5 times 34 do make 170 li. Then for 7 s. 8 d.

8 d. take the $\frac{1}{3}$ of 34 l. which is 11 l. 6 s. 8 d.
thirdly, for 1 s. take 34 s. which is 1 l. 14 s.
finally for the $\frac{1}{2}$ gross, you must take $\frac{1}{2}$ of
the 5 l. 7 s. 8 d. which is 2 l. 13 s. 10 d.
And then adde your 4 products together, and
you shall find that the 34 gross $\frac{1}{2}$ at 5 l.
7 s. 8 d. the gross, is worth 185 l. 14 s. 6 d.
as appeareth in the example following.

At 5 l. 7 shil. 8 d.
What 34 $\frac{1}{2}$?

170 l.	0 shil.	0 d.
11	6	8
1	14	0
2	13	10
185 lib.	14 shil.	6 d.

And as in the last example you did, so
the $\frac{1}{2}$ gross, take half of the price (that one
gross was worth) and therefore because
gross is worth 5 l. 7 s. 8 d. the $\frac{1}{2}$ gross
must be worth half so much. So likewise
if you have $\frac{1}{3}$ of 8 gross, or of any other
thing, you must take the $\frac{1}{3}$ of the price that
one gross is worth. And in like manner
for the $\frac{1}{4}$ of any thing, you shall take the
of the price, also if you have the $\frac{1}{7}$, take the
of the price that one is worth, and so of all
other fractions, as by these examples follow-
ing doth appear.

At 4 lib. 6 shil. 8 d.
What 46 ½

184	0	0
15	6	8
2	3	4

201 lib. 10 shil. 0 d.

At 8 lib. 0 shil. 9 d.
What 54 ⅓?

432.	0	0
1	7	0
0	13	6
2	13	7

436 lib. 14 shil. 1 d.

At 3 lib. 16 shil. 8 d.
What 17 ¾?

51	0	0
8	10	0
5	13	4
1	18	4
0	19	2

68 lib. 00. shil. 10 d.

If you will make the proof of these rules aforesaid, you must first abate the fraction of money (which the fraction of the multiplication doth import) from the total summe. And divide the rest of the pounds

of

of the said total summe, by the whole multiplicand the fraction only excepted. And if any thing doe remain after the diuision is made, that remain shall bee multiplied by 20: and unto the product of that multiplication, you shall adde the shillings which remained of the rest of the total summe. Lastly, if any thing doe remain after the last diuision, you must multiply the same by 12, and unto the product adde the pence of the total sum that remained, if any be. And thus if yee haue truly wrought, you shall find again the higher sum of your question, that is to say, the price that one gross or any other thing is worth, whereof the question is demanded.

Or otherwise reduce the remain of the total summe (the value of the money that the fraction is worth being first reduced) all into pence, in multiplying the pounds by 20, and the shillings by 12, and adding thereunto the shillings and pence, which are ioyned with the remain of the said total summe if any such be, then diuide that pence by the aforesaid number that is to be multiplied, the fractions of the same number being alsoabated. So shall you find the price that one piece, one grosse, or any other thing is valued at; As in the first of the

examples going before, where the totall summe is 201 l. 10 s. from the which I doe rebate the price of the half grosse, which is 2 l. 3 s. 4 d. the rest is 199 l. 6 s. 8 d. which being reduced into pence, bring-eth 47840 d. I divide the same by 46. and thereof cometh 1040 d. Then I divide that 1040 d. by 12, and they bring 86 s. 8 d. that is to say, 4 l. 6 s. 8 d. which is the price that one grosse, or any other thing did cost, as in that first example doth appear.

The like is to be done of any manner of thing that is sold by the hundred, after 5 score to the hundred.

As thus: at 12 l. 7 s. 6 d. the hundred pounds weight, what shall 374. pound weight cost? You shall first multiply 12 l. 7 s. 6 d. by 3, that is to say, by three hundred. Then for fifty pound weight you shall take the half of 12 l. 7 s. 6 d. because 50 l. is the $\frac{1}{2}$ of 100 l. Likewise for 20 pound weight which is the $\frac{1}{5}$ of 100 l. you shall take the $\frac{1}{5}$ of 12 l. 7 s. 6 d. and for 4 pound weight you must take the $\frac{1}{5}$ of the last product. This done

Rule 13

At 12 l. 7 s. 6 d.			
What 374.			
37	2	6	
6	3	9	
2	9	6	
0	9	10	
461 l.	5 s.	7 d.	

you must adde all these products into [illegible] sum, which will make ye sum of 46 l. 5 s. 7 [illegible] 3; as by the example before doth appear.

The proof is made by reducing the [illegible] sum into pence, and to divide the product by the number that is to be multiplied, that is to say, by 374, likewise divide the quotient produced of that first division by 12: so shall you finde again the higher sum 14 l. 7 s. 6 d. which is the price of 100 l. weight, as before.

Also the like may be done of our usual weight here in England, (which is 112 l. for every 100 l. weight) in case you know the aliquot parts of 100, that is to say, of 112 l. weight, which are these, 56 l. 28 l. 14 l. & 7 l. For 56 l. is the $\frac{1}{2}$ of 112: 28 l. is the $\frac{1}{4}$ of 112 l. 14 l. is the $\frac{1}{8}$ and 7 l. is the $\frac{1}{16}$.

Therefore for 56 l. take the $\frac{1}{2}$ of the sum of mony that the 112 l. weight is worth.

For 28 l. take the $\frac{1}{4}$ of the sum of mony that 112 l. is worth.

For 14 l. take the $\frac{1}{8}$ of the sum that the C is worth.

For 7 l. take the $\frac{1}{16}$ of the sum of mony that the C is worth.

As thus, at 3 l. 6 s. 8 d. the 100 l. weight that is to say, the 112 l. what shall 24 [illegible]

3 quarters 21 l. weight cost after the

First, you shall multiply 24 hundreds by which is the 3 l. and thereof will come l. then for 6 s. 8 d. which is the $\frac{1}{3}$ of 20 s. you shall take the $\frac{1}{3}$ of 24, which is 8 l. for 24 nobles, maketh 8 l. afterward, for the 3 of the C. you shall for the 56 l. take $\frac{1}{2}$ of 3 l. 6 s. 8 d. because 56 l. is the $\frac{1}{2}$ of the C. and thereof cometh 1 l. 13 s. 4 d. for 28 l. (which is the quarter of a C.) you shall take the $\frac{1}{4}$ of 3 l. 6 s. 8 d. or else the $\frac{1}{2}$ of the product, which cometh last of 56 l. which is 16 s. 8 d. likewise for 14 l. you must take the $\frac{1}{2}$ of 3 l. 6 s. 8 d. which is 8 s. 4 d. or else the $\frac{1}{2}$ of the product that cometh of 28 l. which is all one. Finally, for 7 l. take the $\frac{1}{10}$ of 3 l. 6 s. 8 d. or else the $\frac{1}{2}$ of the last product that cometh of 14 l. and thereof cometh 4 s. 2 d. Then add all these parts together: and the total sum will be 83 l. 2 s. 6 d. so much are the 24 C. 3 qu. 21 l. weight worth after 3 l. 6 s. 8 d. the C. as appeareth in the margent.

At 3 li. 6 shil. 8 d.			
what 24 C. 3. q. 21 l.			
	72	0	0
	8	0	0
	1	13	4
		16	8
		8	4
		4	2
	83 l.	2 s.	6 d.

The proof hereof is made, like to the other proofs aforesaid, saving, that where in those proofs you abate the price of the money, that the fraction was worth, from the total sum; here in this example (and in such other like) you must abate the price of the money, that the odde weight amounteth unto (over and above the just hundreds) from the total sum; the rest thereof shall you convert into pence, dividing the product of the multiplication by the just number of the number of the hundreds, so shall you finde the pence, that one hundred is worth: which you shall bring into pounds by the order of division, and so of all other.

Chap. 3.

Of the Rule of Three composed, the which is distinct into Four Rules, each of them differing, the one from the other.

Here belongeth to the first and second parts of the Rule of Three composed alwayes five Numbers: whereof (in the first part of the Rule of Three composed) the second Number, and the fifth, are alwayes of one semblance

the denomination: whose rule is thus. You must multiply the first number by the second, and that shall be your divisor, then multiply the other three numbers the one by the other to be your dividend. Rule 1.

Example of this first part, If 100 Crownes in 12 Months doe gain 15 l. what will 60 Crownes gain in 8 Months? Answ. First multiply 100 Crowns by 12 months, and thereof cometh 1200 for your divisor, then multiply 15 l. by 60 Crowns, and by 8 months, and you shall have 7200; therefore divide 7200 by 1200, and thereof cometh 6 l. so many l. will 60 Crownes gain in 8 months: this Question may bee done by the double Rule of Three, that is to say, by the Rule of Three at two times. But yet this Rule of Three composed is more brief.

Crowns.	Month.	Pounds.	Crowns.	Months.
100	12	15	60	8

x

7200

1200 6 lib.

2 In the second part of the Rule of Three composed the 3 number is like unto the first, whereof the rule is thus. You must multiply the third number by the 4, and the product shall be your divisor, then multiply Rule

the first number by the second, and the product thereof by the fift, the which number shall be your dividend, or number that is to be divided: as by example.

When 60 crowns in 8 months doe gain 6 l. in how many months will 100 crowns gain 15 l? Answer. Multiply the third number 6 by the fourth number 100: and thereof cometh 600 which shall bee your Divisor: then multiply the first number 60, by the second number 8, and the product thereof by the fift number 15, and there will come 7200: then divide 7200 by 600, and the quotient will bee 12, in so many months will 100 crowns gain 15 l. This question may likewise be done by the Rule of 3, at 2 times.

Crown.	Months.	Pounds.	Crowns.	Pounds.
60	8	6	100	15

x

7200 Months.
6600 (12

In the third part of the Rule of Three composed, there may bee 5 numbers, or more: and in this rule the first number & the last are alwaies dissemblant, and of unlike denomination, the one to the other: and the question

...tion is from the last number unto the ... whereof the Rule is thus. You must ... multiply that number which you would ... by those numbers which do give the ..., and divide the product of the same by ... multiplicatt on of the numbers which ... already valued, as by example. If 4 de... Parisis be worth 5 deniers Tour... and 10 deniers Tournois, be worth 12 ... of Savoy, I demand how many ... Parisis, are 8 deniers of Savoy ...? Ans. Multiply 8 deniers of Savoy (which is the number that you would ...) by 4 deniers Parisis and by 10 ... Tournois, which are the numbers ... give the value, and they make 320: ... multiply 5 deniers Tournois, by 12 ... of Savoy, which are the numbers ... valued, and they make 60: Finally ... 320 by 60, and you shall finde 5 ... $\frac{1}{3}$ Parisis, so much are the 8 den... of Savoy worth. Rule 3

Parisis.	Tournois.	Tournois.	Savoy.	Savoy.
4d.	5d.	10d	12d.	8.

320 par.

60 (5d. $\frac{1}{3}$

In the 4th part of the Rule of 3 compo... the first number & the last are always

semblant and of one denomination, and the question of this Rule, is always from the last number to that last saving one, whereof there is a rule, which is thus: You must multiply the number which you would know, by the numbers that are already valued, & divide the product of the same by the multiplication which commeth of the numbers that give the value, as by example.

Rule 4

If 4 deniers Parisis, be worth 5 deniers Tournois, and 10 deniers Tournois be worth 12 deniers of Savoy: I demand how many deniers of Savoy, are 15 deniers Parisis worth? Answ. Multiply 15 deniers Parisis that you would know, by 5 deniers Tournois, and by 12 deniers of Savoy, which are the numbers already valued, and they make 900. Divide the same by 4 times 10, which are the numbers that do give the value, that is to say, by 40, and you shall finde 22 deniers $\frac{1}{2}$ of Savoy: so much are the 15 deniers Parisis worth.

Parisis.	Tournois.	Tournois.	Savoy.	Paris.
4 d.	5 d.	10 d.	12 d.	15 d.
	12			
	00		0 Savoy.	
	44	0	22 d. $\frac{1}{2}$	

The third Chapter treateth of Questions of the trade of Merchandize, in the which is taught the Rule of Three in Fractions, beginning at the Question following.

IF 31 Vebonsh. Dozens, do cost me 100 l. 15 s. what shall 4 Dozens cost after the same rate? Ans. First bring the 100 l. 15 s. all into shil. in multiplying the 100 l. by 20, and adding to the product the 15 s. and thereof commeth 2015 s. then multiply 2015 by the third number 4, and divide the product by 31, and the quotient will be 260 s. The which divide again by 20, and thereof commeth 13 l. And so much are the 4 Dozens worth.

Dozens.	Lib.	shil.	Dozens.
31	100	15	4
	20		
	2015		
	4		
	8060		

28
8060 (260
yyyy

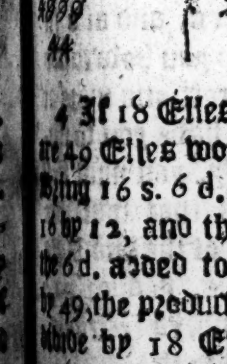
If 4 dozens be worth 13 l. what are 31 dozens worth by the price? Anſ. Multiply 31 by 13, and thereof commeth 403. The which you ſhall divide by 4, and thereof commeth 100 l. ¾ which ¾ are 15 s. and ſo much are 31 dozens worth, as before.

Dozens.	Lib.	Dozens.
4	13	31
		13
		93
		31
		403
403		
444 (100 l. ¾.		4

3 If 49 Ells be worth 2 l. 4 s. 11 d. what are 18 Ells worth by the price? Firſt you muſt bring 2 l. 4 s. 11 d. all into pence, in multiplying 2 l. by 20 maketh 40, adde thereto 4 ſhil. they make 44 ſhil. the which multiply by 12 d. and they make 528 d. whereunto adde 11 d. all is 539 d. the which 539 d. muſt be your ſecond number in the Rule of Three, then multiply 539 by the third number 18, and thereof commeth 9702, divide the ſame by 49, and you ſhall have in your quotient 198 d. the which divide by 12, and you ſhall find

16 shil. 6 pence: so much are the 18 Ells worth.

Elles.	lib.	shil.	d.	Elles.
49	2	4	11	18
	20			539
	44			18
	12			4312
	88			539
	441			9702
	1			



4 If 18 Elles be worth 16 s. 6 d. what are 49 Elles worth by the price? Answer. Bring 16 s. 6 d. into pence in multiplying 16 by 12, and thereof cometh 198 d. with the 6 d. added to it, then multiply 198 d. by 49, the product will be 9702. The which divide by 18 Elles, and thereof cometh 539. Then divide 539 by 12, and the product thereof by 20: So shall you have

2 l. 4 s. 11 d. and so much are the 49 Elles worth.

Elles.	shil.	d.	Elles.
18	16	6	49
	12		198
	32		392
	166		441
	198		49
			9072

17		1	
446		192	
9782	(539	739	(44 shil.
1888		122	
11		7	

Note, that whereas in the first part of this Book, I have set forth the Rule of Three both in whole numbers, and also in fractions: Now I will shew you how to doe the said Rule of Three in fractions more at large. And because I would have you to understand the same generally, you must first consider if the three numbers that shall be propounded (in any question of the said Rule of Three) bee all fractions, yea or no: which if they be all three numbers fractions, then must you work as followeth.

First, you must multiply the Numera-

tors

ers of the second and third fractions in your Rule of three, the one by the other, and again you must multiply that product, by the denominator of the first fraction: and the number which cometh of this last multiplication, shall be your dividend, or number that must be divided.

Secondly, you must multiply likewise the Denominators of the second and third fractions in your said Rule of Three, the one by the other, and the ofcome again by the numerator of the first fraction: And the number, which is produced of that multiplication, shall be your divisor.

Thirdly, you must divide the aforesaid dividend by the divisor, and the quotient will be the answer to the question, as by Examples shall hereafter appear.

But if you finde whole numbers & fractions together, in the said Rule of Three: you must first reduce the same into their fractions by the first Reduction.

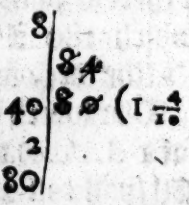
Likewise if you finde any of the three numbers in your Rule of 3, to be whole numbers, alone without any fraction joyned with it, you must in this case put 1 under the same whole number with a line between them both: The which 1 doth represent the denominator to the same whole number,

number, and then you must proceed to worke the Rule of Three in like manner as though they were all fractions: as before is said.

The Examples of all three differences aforesaid, doe follow in the Three next Questions orderly.

IF $\frac{2}{3}$ X $\frac{4}{5}$ $\frac{7}{8}$: I doe understand thereby that as followeth: If $\frac{2}{3}$ of any weight, or measure bee worth $\frac{4}{5}$ of 20 s. or of any other sum, what are $\frac{7}{8}$ of the like weight or measure worth after the rate? Answ. First, as is said before, I doe multiply the Numerators of the second and third fractions, the one by the other: that is to say, 7 by 4, and they make 28: again, I do multiply the said 28 by the denominator of the first fraction, that is to say, by 3, and thereof cometh 84, the which 84, I set over the crosse for my dividend. Secondly, I doe multiply the Denominators of the second and third Fractions, the one by the other: Namely 8 by 5, and they make 40: again, I doe multiply the said 40 by the Numerator of the first Fraction, that is to say, by 2, and thereof cometh 80, the same 80 I doe set under the crosse for my Divisor. Then I divide 84 by 80, and there cometh

the quotient 1 l. and $\frac{4}{10}$ remaining, the which $\frac{4}{10}$ being abbrevied, maketh $\frac{1}{2\frac{1}{2}}$ of a pound, which is worth 12 d. And so much will the aforesaid $\frac{7}{3}$ cost, as by the work following doth appear.



6 If $\frac{3}{7}$ of an Ell of any merchandize do cost me 12 s. 7 d. the which 7 d. doth make 1, what will $\frac{9}{10}$ of an Ell cost me after the same rate? Answer. First I set down my numbers as followeth. If $\frac{3}{7}$ X 12, $\frac{7}{12}$, $\frac{9}{10}$. Then by the 6 Reduction I reduce $12\frac{7}{12}$ all into Twelves, and they make $\frac{151}{12}$ for the second number in my Rule of 3, which must stand in the place of $12\frac{7}{12}$. And then will my three numbers stand thus as followeth, $\frac{3}{7}$ X $\frac{151}{12}$ $\frac{9}{10}$. Then I multiply 151 by 9, and the effcome by 5, and thereof com-

cometh 6795, the which I do set over the cross, for my dividend. Likewise I multiply 12 by 10, and the off-come by 2, and thereof cometh 240: which I do set under the cross for my divisor. Then I divide 6795 by 240: and thereof commeth in the quotient 28 s. and 75 remaining, the which 75, because it is the remain of s. I do multiply it by 12 d. for that there is 12 d. in a s. and thereof cometh 900, the same 900 I divide again by 240, & thereof cometh 3 d. and 180 remaining, which 180 I do set apart over 240, with a line betwéen them both, and they are $\frac{180}{240}$. The which being abbrevied, do make $\frac{3}{4}$ of a d. And thus I finde that the $\frac{9}{10}$ of an Ell shall cost 28 s. 3 d. $\frac{3}{4}$, as appeareth.

151	12
	12
7	24
12	
12	127
	151
151	12
9	10
1359	120
5	2
6795	240

6795

$\frac{2}{5} \times \frac{151}{12}$ $\frac{9}{10}$

240

3

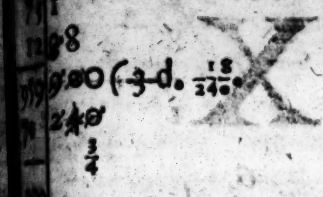
297

6795 (28 shil.

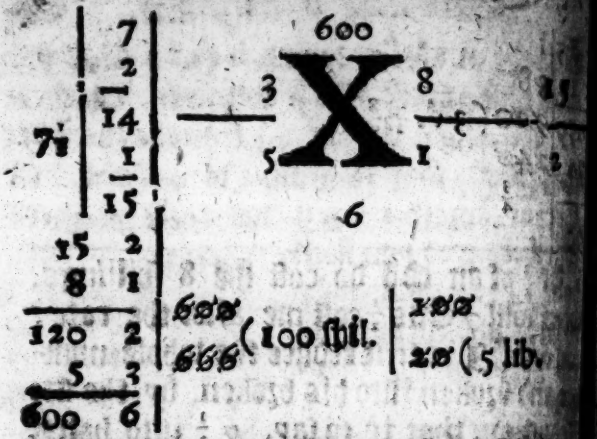
2400

24

75



If $\frac{3}{7}$ of an Ell do cost me 8 shillings, what will 7 Ells $\frac{1}{2}$ cost me after the rate? Answer. I do first reduce the whole number and broken into his broken, by the first reduction, that is to say, 7 $\frac{1}{2}$ into halfs, and they are $\frac{15}{2}$, which must be the third number in my rule of three, the second number is 8 shillings, but I must (as before is taught) put 1 under 8 with a line between them, to make it like a fraction thus: $\frac{8}{1}$. Then must my three numbers in my Rule of three, stand after this manner: $\frac{3}{7}$ X $\frac{8}{1}$ $\frac{15}{2}$. Then I do multiply 15 by 8, & the product thereof by 5, amounteth to 600: The which do set over the cross for my dividend. Likewise I do multiply 2 by 1, and the product thereof by 3, and thereof cometh 6, the which I do set under the cross for my divisor. Then I divide 600 by 6, and I find in my quotient 100; the which is 100 s. I do therefore divide 100 by 20 s. and my quotient is 5 l. And so much will the 7 Ells $\frac{1}{2}$ cost me, as hereafter doth appear.



If one yard of Velvet cost 19 shillings what shall $\frac{1}{4}$ of a yard cost? Answer, set down your numbers thus: If $\frac{1}{1}$ X $\frac{19}{1}$ Y multiply 1 times 19, by 3: and there cometh 57 for your dividend, or number to be divided: the which 57 you shall divide by 1 times 1, 4 times, which are 4, and your quotient will bee 14 s. $\frac{1}{4}$ which is worth 3 d. so much are the $\frac{1}{4}$ of a yard worth after 19 shillings the yard, as by practise followeth.

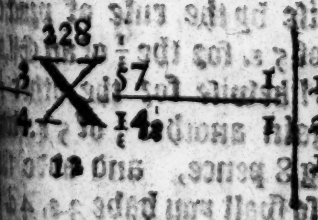
Or otherwise by the rules of pra

[illegible] for $\frac{3}{4}$ of a yard which is $\frac{1}{2}$ of a yard, you must take the $\frac{1}{2}$ of 19 shillings, which is 9 s. 6 d. then for $\frac{3}{4}$ of a yard take the $\frac{1}{2}$ of the product, that is to say, of 9 s. 6 d. and thereof cometh 4 s. 9 d. adde these numbers together, and you shall have 14 s. 3 d. as above is said, and as appeareth here in the margin.

19 shil.	
9 shil.	6 d.
4	9
14	3

If $\frac{3}{4}$ of a yard of Velvet do cost 14 s. 3 d. what shall a yard cost? Answer. Set your numbers down thus: If $\frac{3}{4}$ X $14\frac{1}{4}$ [illegible] $14\frac{1}{4}$ into a fraction, and they will be [illegible] then multiply 57 by 1. 4 times, and thereof cometh 228 for your dividend. Likewise multiply 1 times 4. 3 times, and thereof cometh 12 for your divisor: then divide [illegible] by 12 and your quotient will be 19 s. [illegible] much is the yard of Velvet worth.

228			1
3 X	57	1	10
4	14	1	228 (19 shil.
12			122
			1



Or otherwise by the Rule of practice: you [illegible] take the $\frac{1}{3}$ part of 14 shillings 3 d.

which is 4 l. 9 d. and adde it with the last 14 l. 3 d. and you shall have 19 shillings, as before.

14 shil. 3 d.
4 9

19 shil. 0 d.

10. If one Ell of Holland cloth be worth 5 s. what are $\frac{1}{3}$ worth after the rate? Answ. Say thus, if $\frac{1}{3} \times \frac{1}{3}$. Then multiply 3 times 5, one time, and thereof cometh for your dividend: likewise multiply 3 times 1, one time, they make 3 for your divisor: then divide 10 by 3, and thereof cometh 3 s. $\frac{1}{3}$ which $\frac{1}{3}$ is worth 4 d. and so much are the $\frac{1}{3}$ of an Ell worth.

$$\frac{10}{3} \times \frac{5}{1} \Big| \frac{2}{3} \qquad \frac{1}{3} \times \frac{1}{1} \Big| \frac{1}{3}$$

3 s. $\frac{1}{3}$ shil. $\frac{1}{3}$

Or otherwise by the rule of practice take first the $\frac{1}{3}$ of 5 s. for the $\frac{1}{3}$ of an Ell, that is 1 s. 8 d. likewise for the other $\frac{1}{3}$ of an Ell, take again another $\frac{1}{3}$ of 5 s. which is also 1 shilling 8 pence, and adde them together, and so shall you have 3 s. 4 d. before.

5 shil.	
1	8
1	8
3 shil.	4 d.

11 If $\frac{2}{3}$ of an Ell of Holland cloath do cost me 3 s. 4 d. what shall 1 Ell cost? Ans. Set down your numbers thus: If $\frac{2}{3}$ X $3\frac{1}{3}$ First, reduce $3\frac{1}{3}$ all into thirds, and it will be $\frac{10}{3}$. Then multiply 1 times 10, 3 times, and thereof cometh 30 for your dividend. Likewise multiply 1 times 3, 2 times, and your dibisor will be 6, then divide 30 by 6, and you shall have 5 s. so much is the Ell of Holland cloath worth.

$$\frac{2}{3} \times \frac{10}{3\frac{1}{3}} \qquad 1 \quad 30$$

30

6 6 (5 shil.

Or otherwise by practice, take the $\frac{1}{2}$ of 3 s. 4 d. which is 1 shilling 8 pence, and adde it to the same 3 shillings 4 d. and thereof will come 5 s. as before. For the $\frac{1}{2}$ of 5 s. is as much as the $\frac{1}{2}$ of 3 s. 4 d. which was the price that the $\frac{2}{3}$ of an Ell did cost, as appeareth.

3 shil.	4 d.
1	8
5 shil.	0 d.

12 If one Ell cost me 17 s. what shall 15 Ells $\frac{1}{2}$ part cost? which $\frac{1}{2}$ is half a quarter of an Ell. Answer. Say, if $\frac{1}{1}$ X $\frac{1}{1}$ 15 $\frac{1}{8}$. First, reduce 15 $\frac{1}{8}$ into eight parts and they make $\frac{121}{8}$, then multiply 121 by 17, 1 time, and thereof cometh 2057, for your dividend. Likewise multiply 8 times 1, 2 times and the product will be 8, for your divisor, then divide 2057 by 8, & you shall find 257 s. $\frac{1}{2}$, which is 12 l. 17 s. 1 d. $\frac{1}{4}$, and so much are the 15 Ells $\frac{1}{2}$ worth, as by practice doth appear in the example following.

2057

$\frac{1}{1}$ X 17 121

1 1 15 $\frac{1}{8}$

8

Or otherwise, for 10 s. take the $\frac{1}{2}$ of 15 which is 7 l. 19 s. then for 5 s. take the $\frac{1}{2}$ of 7 l. 10 s. which is 3 l. 15 s. Thirdly, for 2 s. take the $\frac{1}{2}$ of 7 l. 10 s. because the $\frac{1}{5}$ of 10 s. is 2 s. Fourthly, for the $\frac{1}{2}$ of the Ell, you shall take the $\frac{1}{2}$ of 17 shillings, which is 2 shillings 1 peny, $\frac{1}{2}$.

15 $\frac{1}{8}$		
17		
7	10	0
3	15	0
1	10	0
	2	1 $\frac{1}{2}$

Then adde all these sums together, and you shall find 1 l. 17 s. 1 d. $\frac{1}{4}$ 12 li. 17 shil. 2 d.

as

before, and as appeareth more plainly in the former practice.

13 If 25 Ells be worth 2 l. 3 s. 4 d. what are 18 Ells $\frac{1}{4}$ worth by the price? Answer. First, put 3 s. 4 d. into the part of 1. and you shall have $\frac{1}{6}$: then say, if $\frac{25}{1}$ gibe 2 l. $\frac{1}{6}$, what shall $18\frac{1}{4}$ gibe? Put the whole numbers 6 into their broken, and then multiply 1 times 13 by 75, the product will be 975, the which you shall divide by 6 times 6, 4 times, which maketh 600. Then divide 975 by 600: and your quotient will be 1 l. and 375 will remain, the which 375 you shall multiply by 20, and thereof will come 7500, divide the sam by 600, your quotient will be 12 s. and 300 will remain, the which abbrevied is $\frac{1}{2}$ which is 6 d: thus the 18 Ells $\frac{1}{4}$ are worth 1 l. 12 s. 6 d. as by practice will appear.

13 75

$\frac{25}{1}$ X $2\frac{1}{6}$ $18\frac{1}{4}$.

Or otherwise by the rules of practice, for because that 12 Ells $\frac{1}{2}$ is the $\frac{1}{2}$ of 25 Ells, therefore take the $\frac{1}{2}$ of 2 l. 3 s. 4 d. which is 1 l. 1 s. 8 d. then for 6 Ells $\frac{1}{4}$ take the $\frac{1}{4}$ of 2 l. 3 s. 4 d. or else the $\frac{1}{4}$ of the last product, that is to say, of 1 l. 1 s. 8 d.) which is all

one, and adde them together, so shall you have 1 l. 12 s. 6 d. as before.

lib.	shil.	d.
2	3	4
1	1	8
	10	10
1 lib.	12 shil.	6 d.

14 If 15 yards be worth 32 s. what are half a yard and half a quarter, or else $\frac{1}{8}$ of a yard worth? Answer. Say, if $\frac{15}{1}$ give $\frac{32}{1}$ what will $\frac{1}{8}$ give? Multiply 1 times 32 by 5, and divide the product by 15 times 8 times, and your quotient will be 1: and $\frac{80}{120}$ remaining, which is $\frac{1}{3}$ of a shilling, that is to say, 4 d. and so much are the $\frac{1}{8}$ of a yard worth, that is to say, 1 s. 4 d.

$$\frac{15}{1} \times \frac{32}{1} \frac{5}{8}$$

Or otherwise, see what the yard is worth after the manner aforesaid in the other examples, and you shall find that the yard is worth 2 s. 1 d. $\frac{3}{7}$, of the which number take first the $\frac{1}{2}$ for $\frac{4}{8}$, which is 1 s. 0 d. $\frac{4}{7}$. of the which number take the $\frac{1}{4}$, for the other $\frac{1}{8}$ which is 3 d. $\frac{1}{7}$ adde these two numbers together, and you shall find the $\frac{1}{8}$ to be worth 1 s. 4 d. as is before said.

2 shil.	1 d.	$\frac{3}{5}$
1	0	
	3	
1 shil.	4 d.	0

15 IF 13 Ells $\frac{5}{6}$ be worth 27 shillings, what are 10 Ells $\frac{2}{3}$ worth by the same rate? Answer. Say, if 13 $\frac{5}{6}$ give $27\frac{1}{1}$, what shall $10\frac{2}{3}$ give? Put the whole numbers into their broken, and you shall find $\frac{83}{6}$, $\frac{27}{1}$, and $\frac{32}{3}$. Then multiply 6 times 27 by 32, and thereof cometh 5184, the which number you shall divide by 83 times 1, 3 times, and you shall find 20 shillings $\frac{51}{83}$, which fraction is worth 8 d. $\frac{9}{83}$ parts of a peny.

83		32
$13\frac{5}{6}$	X $\frac{27}{1}$	$10\frac{2}{3}$.

16 IF 2 yards $\frac{1}{2}$ be worth 4 s. 8 d. what are 8 yards $\frac{1}{4}$ worth? Answer. Put the 8 d. into the part of a s. setting 8 over 12, and it will be $\frac{8}{12}$, which abbreviated are $\frac{2}{3}$, then reduce whole numbers into 3 broken, and they still stand thus: $\frac{1}{2}$ $\frac{14}{3}$ $\frac{33}{4}$, then multiply 2 times 14 by 33, and divide the product by 5 times 3, 4 times: and you shall find 15 s. and $\frac{24}{60}$ will remain, which are worth 4 pence $\frac{4}{5}$, so much are the 8 yards worth.

5 14 33

$2\frac{1}{5}$ $4\frac{1}{3}$ $8\frac{1}{4}$

17 If 1 Kerſey be worth 2 l. 6 s. 8 d. how many Kerſeys ſhall I buy for 36 l. 3 s. 4 d. after the rate? Anſwer. Put 6 s. 8 d. into the part of a l. and you ſhall have 2 l. $\frac{1}{3}$ for the firſt number in the rule of three, 1 Kerſey for the ſecond number: then put 3 s. 4 d. into the part of a pound, and it is $\frac{1}{6}$ ſo you ſhall have 36 l. $\frac{1}{6}$ for the third number, then will your 3 numbers in the rule of three ſtand thus: $2\frac{1}{3}$ X $\frac{1}{1}$ $36\frac{1}{6}$. Then reduce the whole numbers into their broken, and it will be thus: $\frac{7}{3}$ X $\frac{1}{1}$ $\frac{217}{6}$, then multiply three times 1 by 217, and thereof will come 651 for your dividend. Likewiſe multiply 7 times 1 by 6: and the product thereof will be 42. Then divide 651 by 42, and you ſhall find $15\frac{1}{2}$. So many Kerſeys of 2 l. 6 s. 8 d. the piece, ſhall you have for 36 l. 3 s. 4 d.

7 117

$2\frac{1}{3}$ X $\frac{1}{1}$ $36\frac{1}{6}$

CHAP. IV.

Of losses and gains in the Trade of Merchandize.

If 13 yards $\frac{1}{3}$ be worth 22 pounds 10 s. how much shall I sell 1 yard to gain or to make 3, 4? which is all one. Ans. by the Rule of Three, if 3 do yield 4, what will 22 $\frac{1}{2}$ yield? multiply and divide, and you shall find 30 l. Then say again by the Rule of Three, if 13 yards $\frac{1}{2}$ do give 30 l. as well of principal, as of gain, what must 1 yard be worth by the price? multiply and divide, and you shall find 2 l. 5 s. and for that price must the yard be sold, to gain the $\frac{1}{3}$ or to make of 3, 4.

180

45 | 180

22 $\frac{1}{2}$ | 66 (30

6

90

40

$$\frac{13\frac{1}{3} \times \frac{30}{1} \quad \frac{1}{1}}{40}$$

Or otherwise, take the $\frac{1}{4}$ part of 22 10 s. which is 7 l. 10 s. that shall be adde with 22 l. 10 s. and you shall

have

	lib.	shil.
have 30 l. as before. Then divide 30 by 13 $\frac{1}{3}$, & you shall finde 2 l. 5 s. as above is said.	22	10
	7	10
	30	00

2 If one yard be worth 27 s. 6 d. for how much shall 16 yards $\frac{2}{3}$ be sold, to gain 2 shillings upon the pound of mony? that is to say, upon 20 s.? Answer. Adde 2 s. unto 20, and you shall have 22, then say, If 20 s. principal, do give 22 s. principal and gain: how much shall 27 s. 6 d. principal yield? Multiply and divide, and you shall finde 30 s. $\frac{1}{4}$. Then say again by the rule of Three. If one yard do give me 30 s. $\frac{1}{4}$ (which is as well the principal as the gain) what shall 16 yards $\frac{2}{3}$ give me? Multiply and divide, and you shall find 25 l. 4 s. 2 d. For the same price shall the 16 yards $\frac{2}{3}$ be sold, to gain after the rate of 2 s. upon the l. of mony, or upon 20 s. which is all one.

551	121	50
$\frac{10}{1}$ X $\frac{21}{1}$ 27 $\frac{1}{2}$ $\frac{1}{1}$ X 30 $\frac{1}{4}$		16 $\frac{2}{3}$

3 If 10 yards $\frac{2}{3}$ be worth 25 l. 10 s. for how much shall 2 yards $\frac{1}{4}$ be sold, to gain after 10 l. upon the 100 l. of mony? Answer. Say, if 100 principal yield 110, as well principal as gain, how much will 25 pound

10 shillings yield me? Multiply and divide, and you shall find 28 l. 1 s. Then say, if 10 yards $\frac{2}{3}$ do yield me 28 l. 1 s. as well principal as gain; how much shall 2 $\frac{1}{4}$ yield me? Multiply and divide, and you shall find 5 l. 18 s. 4 d. $\frac{1}{12}$. and for so much shall the 2 yards $\frac{1}{4}$ be sold, to gain after 10 l. upon the 100 l. of money.

	51
$\frac{100}{1}$ X $\frac{100}{1}$	25 $\frac{1}{2}$
32 561	9
10 $\frac{2}{3}$ X 28 $\frac{1}{10}$	2 $\frac{1}{4}$.

And although that in these questions of gain and loss, sometimes the first number is not like unto the third number, that is to say, of the same denomination, for whereas one would say, if 20 s. gain 2 s. what shall 50 l. gain? or what shall 25 l. gain? &c. Or if 20 l. do gain 2 l. what shall 15 s. gain? or what shall 27 s. $\frac{1}{2}$ gain? Yet the same doth not probe that the rule is therefore false. For if 20 s. do gain 2 s. 20 l. shall gain 2 l. and 20 d. shall gain 2 d. likewise 20 Crowns shall gain two Crowns, and so of all others. Therefore it is to be understood, that the first number of the Rule of Three in these reasons, is pur-

posed

ted to be semblable, or like to the third in quality or name.

When one Merchant selleth wares together, and he giveth to the buyer 2 upon 15: how much shall the buyer gain upon the 100, after the rate?

Ans. First, adde 2 unto 15, and they are 17, then say, if 15 give 17, what shall 100 give? Multiply and divide and you shall find $13\frac{1}{3}$, so the buyer getteth after the rate of $13\frac{1}{3}$ upon the 100.

15 | 17 : | 100.

4 If one Northern dozen cost me 3 l. 5 s. I sell the same again for 3 l. 12 s. 6 d. how much doe I gain upon the pound of money after the rate? Answer, Say, if 3 l. $\frac{1}{4}$ give 3 l. $\frac{5}{8}$ what shall $\frac{20}{1}$ give? put the two numbers into their broken, and you shall have $\frac{3}{4} \times \frac{3}{5} \frac{20}{1}$, then multiply 4 times 29 by 20, and thereof cometh 1320: for your number that is to be divided: likewise multiply 13 times 8, 1 time, and thereof cometh 104. Then divide 1320, by 104 and you shall find 22 shillings $\frac{4}{13}$. So I shall get 2 s. $\frac{4}{13}$ upon 20 s. or upon the pound of money.

12 29

$3\frac{1}{4} \times 3\frac{5}{8} \frac{20}{1}$.

5 If

If a yard of cloth coſt me 7 s. 8 d. and forward I ſell of the ſame cloth 13 yards for 4 l. 13 4 d. I would know whether I win or loſe, and how much upon the 100 l. of money? Anſwer. See firſt at 7 s. 8 d. the yard what the 13 yards ½ ſhall coſt, you ſhall find 5 l. 1 s. 7 d. And I ſold the ſame but for 4 l. 13 s. 4 d. ſo that I doe loſe upon the 13 yards ½ the ſum of 8 s. 3 d. Then if you will know how much is loſt in the 100: Say by the rule of three, if 5 l. 1 s. 7 d. doe loſe 8 s. 3 d. what will 100 l. loſe? firſt, put 1 s. 7 d. into the part of a l. and it will bee $\frac{19}{240}$. Likewiſe put 8 s. 3 d. into the part of a l. and it is $\frac{33}{80}$. Then will your numbers ſtand thus. $5\frac{19}{240} \times \frac{33}{80} \frac{100}{1}$, reduce the whole into his broken, and then multiply and divide, ſo you ſhall find 8 l. $\frac{1584}{5776}$, which fraction is worth 2 s. 5 d. $\frac{1584}{1219}$, and ſo much is loſt in the 100 l. of money.

$$\frac{1219}{5\frac{19}{240} \times \frac{33}{80} \frac{100}{1}}$$

Againe, If 12 yards ½ of ſcarlet, be ſold for 30 l. 15 s. upon the which is gained after the rate of 11 ½ upon the 100: I demand what the yard did coſt at the firſt? Anſw. From 30 l. 15 s. ſubſtract his $\frac{1}{10}$ part, which is 3 l. 1 s. 6 d. and there reſteth 27 l. 13 s. 6d.

6 d. the which number multiplied by 5 bringeth 55 l. 7 s. of the which number take the $\frac{1}{5}$, which is 11 l. 1 s. and 4 d. and $\frac{4}{5}$. Then take again the $\frac{1}{7}$ of the said 11 pounds 1 shilling 4 d. $\frac{4}{7}$, which is 2 l. 4 shillings 3 pence, $\frac{3}{7}$, and so much did the yard cost at the first penny.

30 lib.	15 shil.	0 d.
3	1	6
27	13	6
2	0	0
55	7	0
11	1	$4\frac{4}{7}$.
2 lib.	4 shil.	3 d. $\frac{3}{7}$

7 Whose, If 15 yards $\frac{3}{4}$ of scarlet, do cost me 32 l. 13 s. 4 d. And I sell the yard again for 2 l. whether do I win or lose, and how much in 1 l. upon the pound of money?

Answer. Look what the 15 yards $\frac{3}{4}$ are worth at 2 l. the yard, and you shall find that they are worth 31 l. 10 s. But they did cost 32 l. 13 s. 4 d. so that there is lost upon the whole, 1 l. 3 s. 4 d. Then to know how much is lost in the l. say by the Rule of three, If 32 l. do lose 1 l. $\frac{7}{15}$, what will 1 l. lose? that is to say, what will 1 pound lose? reduce the whole numbers into their broken

and

then multiply 1, and divide, so shall you [illegible] parts of a l. Then multiply 21 by [illegible] d. because so many pence are in a l. [illegible] divide the product by 588, and you shall [illegible] 8 d. $\frac{336}{588}$, which being abbredied, do [illegible] $\frac{4}{7}$, and thus you see that 8 d. $\frac{4}{7}$ is lost in [illegible] pound of mony.

98 7

$32\frac{2}{3}$ X $1\frac{1}{6}$. $\frac{2}{3}$

8 If 1 yard of cloth of tissue be sold for [illegible] l. 15 s. whereupon is lost after the rate of [illegible] d. in the 100: I demand what 12 yards [illegible] the same tissue did cost? Answer. Adde [illegible] 3 l. 15 s. his own $\frac{1}{10}$ part, which is 7 s. [illegible] d. and all amounteth to 4 l. 2 s. 6 d, then [illegible] what the 12 yards $\frac{1}{2}$ will amount un- [illegible] after 4 l. 2 s. 6 d. and you shall finde [illegible] they will come to 51 l. 11 s. 3 d. so [illegible] did the 12 yards $\frac{1}{2}$ cost.

[illegible] l. 15 s. 0 d.	12 $\frac{1}{2}$
7 6	4 l. 2 shil. 6 d.
[illegible] l. 2 shil. 6 d.	48 00 0
	1 10 0
	2 01 3
	51 l. 11 shil. 3 d.

[illegible] More, if I sell one Wiltshire white [illegible] l. 12 s. whereupon I do gain after [illegible] rate of 2 s. upon the l. of mony:

that is to say, upon 20 s. I demand what 11 pieces of the same whites did cost me? Answer. From 6 l. 12 s. (which is 132 s.) you shall substract his $\frac{1}{11}$ part, that is to say 12 s. & there will remain 120 s. or 6 l. Then see at 6 l. the cloth, what the 11 cloths are worth, and you shall find that they are worth 66 l. And so much did the 11. cloths cost.

132 shil. $\frac{1}{1}$	X $\frac{1}{1}$	11
12 shil.		6
120 shil.		66 l.

1 If I sell 10 ells $\frac{1}{2}$ of Holland for 22 s. 9 d. whereupon I do lose after the rate of 2 s. in the l. of mony. I demand what the ell did cost me? Answer. Say by the rate of three, if 18 gibe 20 s. what will 22 s. 9 d. gibe? Multiply and dibide, and you shall find 25 s. Then dibide 25 s. by 10 $\frac{1}{2}$, and there cometh 2 s. 4 d. $\frac{4}{7}$. So much did the ell cost.

$\frac{18}{1}$ X $\frac{20}{1}$ 22 $\frac{1}{2}$.

11 If I sell one cloth for 5 l. whereupon I do lose after 10 in the 100. I demand how much I shall lose or gain in the 100 if in case I had sold the same for 5 pound 10 shil. Answ. Say, if 90 yield 100, how much will 5 pound gibe? Multiply and dibide, and you shall finde five pound

ſay again by the Rule of Three, it
ome to 15 1/2 what will 100 come unto?
tiply and divide, and you ſhall finde
which being ſubſtracted from 100
will remain 1 1/2 and ſo much is loſt in
100. 1/2

CHAP. VI.

Of lengths and breadths of Tapeſtry, and other Clothes.

If a piece of Tapeſtry be 5 ells 1/2 long,
and 4 ells 1/2 in breadth, how many ells
doth the ſame piece contain? Anſw.
ply the length by the breadth, that is
5 1/2 by 4 1/2 and thereof will come 26
ſo many ells ſquare doth the ſame
contain. 1/4

More, if a piece of Tapeſtry do con-
32 Ells ſquare, and the ſame being
ength 6 ells 1/2 I demand how many ells
adth the ſame piece doth contain?
nſw. Divide 32 ells by 6 1/2, and there of
meth 5 1/13. So many ells doth the ſame
contain in breadth.

More, a piece of cloth being 13 yards
length, and 5 quarters 1/2 a quarter in
adth, how many yards of 1/3 and 1/4 of one
broad will the ſame piece make? Anſ.
ſt by the 5 Reduction what part of
and the 1/4 and 1/2 quarter be, and you ſhall

finde that they make $\frac{11}{4}$, which is one yard
Then multiply 13 yards $\frac{1}{2}$ by 1 yard $\frac{1}{4}$
shall haue 18 yards $\frac{3}{4}$ in square, the
you must diuide by $\frac{3}{4}$ and $\frac{5}{4}$ being redu
into one fraction by the 5 Reduction
is to say by $\frac{5}{4}$ (because the $\frac{3}{4}$ and $\frac{1}{4}$
brought into one fraction, maketh $\frac{5}{4}$) and
shall finde 22 yards. So many yards
and $\frac{1}{4}$ broad doth the same piece contain

4 Woze, a Merchant bought 4 yards
cloth, being six quarters and half one
ter broad, to make him a goben, the
he will line throughout with black
$\frac{1}{4}$ of a yard broad. I demand how
he must buy? Answ. Multiply the le
the cloth by the breadth, that is to
by $1\frac{5}{4}$ (which is the 6 quarters $\frac{1}{4}$ a
and thereof cometh 7 yards $\frac{7}{4}$, the
diuide by $\frac{1}{4}$, and you shall finde 10
so many yards of Way must he haue
the same 4 yards $\frac{1}{4}$ of cloth being of 6
ters, and $\frac{1}{4}$ a quarter broad.

5 Woze, at 6 s. 8 d. the ell square,
shall a piece of Tapestry cost me, wh
5 ells $\frac{1}{4}$ long, and 4 ells $\frac{1}{4}$ broad? An
Multiply $5\frac{1}{4}$ by $4\frac{1}{4}$, and thereof co
23 ells $\frac{1}{4}$ square, then say by the Rule
if 1 ell square cost me 6 s. 8 d. what
$33\frac{1}{4}$ ells cost? Multiply and diuide
you shall finde 7 l. 15 s. 10 d. so

piece of Tapestry did cost.

Or otherwise by the rules of practice, take the $\frac{1}{3}$ of 23 $\frac{2}{7}$: and you shall find 7 l. 10 d. as above is said.

Note, a piece of Holland cloath containing 42 ells $\frac{3}{7}$ Flemmish, how many Ells English do they make? Here you must first note, that 100 ells Flemmish, do make 60 ells English, and so consequently 5 ells Flemmish, do make but 3 ells English, therefore say by the Rule of 3, if 5 Ells Flemmish, do make 3 ells English, how many English will 42 ells $\frac{3}{7}$ Flemmish make? Multiply and divide, and you shall find 25 ells $\frac{1}{7}$ English, and so many ells English doth 42 ells $\frac{3}{7}$ Flemmish contain, and like is to be done of all others.

Note, I have bought a piece of Tapestry being 5 ells $\frac{3}{4}$ long, and 4 ells $\frac{2}{3}$ broad Flanders measure, I demand how many ells square it maketh English measure?

Answer. First, forasmuch as 3 ells English square worth 5 ells Flemmish, therefore put 3 ells English into his square, in multiplying 3 by it self, which maketh 9: likewise multiply 5 in it self squarely, and it will be 25. Then multiply 5 $\frac{3}{4}$, which is the length of the piece, by 4 $\frac{2}{3}$, which is the breadth, and thereof cometh 26 ells $\frac{5}{6}$, then say by the Rule of 3, if 25 ells

ells square of Flemmish measure be worth 9 ells square of English measure; what are 16 ells ½ Flemmish worth? Multiply and divide, and you shall find that they are worth 9 ells $\frac{31}{40}$ square of English measure.

8 More, at 3 s. 6 d. the ell Flemmish, what is the English ell worth after the rate? Answer. First say, if 5 ells Flemmish be worth 3 ells English, what is 1 ell Flemmish worth? Multiply and divide, and you shall finde ⅗ of an English Ell. Then say again by the Rule of Three, if ⅗ of an English Ell be worth 3 s. 6 d. what is 1 English Ell worth? Multiply and divide, and you shall finde 5 s. 10 d. so much shall the English Ell be worth.

9 More, at 6 s. 8 d. the Flemmish ell square, what is the English Ell worth? Answer. Say by the aforesaid reason, if 25 Ells Flemmish square, be worth 9 Ells square English, what is 1 ell square Flemmish worth? Multiply and divide, and you shall find $\frac{9}{25}$ of a square English Ell. Then say, if $\frac{9}{25}$ of an English Ell be worth 6 s. 8 d. what is 1 square English ell worth? multiply and divide, and you shall find 18 s. 6 d. $\frac{6}{9}$, so much shall one English ell square be worth.

CHAP.

CHAP. VII.

Of the reducing of the Pawns of Genes into English yards.

Note that 100 Pawns do make 26 Yards, and 1 Pawn is $\frac{13}{50}$ of a Yard after the same rate, and 3 pawns $\frac{1}{11}$ do make 1 yard.

Example.

I have bought 97 Pawns $\frac{1}{2}$ of Genes Velvet, and I would know how many yards they will make: Answ. Say by the Rule of Three, if 100 pawns do make 26 yards, what will 97 $\frac{1}{2}$ make? multiply and divide, and you shall have 25 yards $\frac{7}{27}$. So many yards do the 97 pawns $\frac{1}{2}$ contain.

Or otherwise, take some other number at your pleasure, as 25 pawns which do make 6 yards $\frac{1}{2}$, and then say by the Rule of Three, if 25 pawns do make 6 yards $\frac{1}{2}$, what will 97 $\frac{1}{2}$ pawns make? Multiply and divide, and you shall finde 25 yards $\frac{17}{25}$, as before.

Now, at 2 s. 7 d. the pawn of Genes what will the English yard be worth after that rate? Answ. Say by the Rule of Three, if $\frac{1}{2}$ of an English yard be worth 2 s. $\frac{27}{11}$. what is $\frac{1}{1}$ yard worth? Multiply and divide, and you shall finde 9 s. 11 d. $\frac{1}{11}$. So

much is the English yard worth. Or otherwise, multiply 100 pawns, which is 26 yards, by 2 s. 7 d. and thereof commeth 258 s. 4 d. the which you must divide by 26 yards, and you shall finde 9 s. 11 d. $\frac{3}{13}$ as before.

3 If 257 pawns $\frac{1}{2}$ be worth 20 l. 16 s. 8 d. What is 1 yard worth after the rate? Answer. Say by the Rule of Three, if 257 $\frac{1}{2}$ pawns be worth 20 $\frac{5}{6}$, what are 3 pawns $\frac{11}{13}$ worth? Multiply and divide, and you shall finde $\frac{1256}{4017}$ parts of a pound, which is worth 6 s. 2 d. $\frac{304}{1338}$, and so much is 1 yard worth.

CHAP. VII.

Of Merchandize sold by weight.

1 AT 9 d. $\frac{1}{2}$ the ounce, what is the 1 weight worth? Answer. Say, if $\frac{1}{2}$ give 9 $\frac{1}{2}$, what will $\frac{6}{1}$ give? Multiply and divide, and you shall finde 12 s. 8 d. so much is the yard worth,

Or otherwise by the Rules of Practice, for 6 d. take the $\frac{1}{2}$ of 16 s. which is 8 s. then for 3 d. take the $\frac{1}{4}$ of 16 s. which is 4 s. Finally for the half pence, take 16 ob. which are 8 d. then adde all these numbers together, and you shall finde 12 s. 8 d. as before.

3 More, at 10 $\frac{1}{2}$ the ounce: what are

l. weight worth after the rate? Answ. ounce 1121. into ounces, in multiplying 1121. by 16 ounces, and you shall have 17936 ounces, then say by the Rule of 3, if 10½. 17936. Multiply and divide, and you shall find 188816 d. which do make 7881.8 s. and so much are the 1121. worth, after 10 d. ½ the ounce.

4 At 12 s. 8 d. the pound weight, what is the ounce worth? Answer. Put 12 s. 8 d. in pence, and you shall have 152 d. then say by the Rule of Three, if 16 ounces cost 152 d. what shall 1 ounce cost? multiply and divide, and you shall find 9 d. ½, so much is the ounce worth.

Or otherwise, take the ¼ of 12 s. 8 d. for 4 ounces, and thereof cometh 3 s. 2 d. then for one ounce, take the ¼ of 3 s. 2 d. and you shall have 9 d. ½ as before.

5 At 32 l. 10 s. the quintal, that is to say, the 100 l. weight: what is 1 l. weight worth after the same rate? Answer. Put 32 l. 10 s. all into s, so you shall have 650 s. Then say by the Rule of Three, if 100 give 650 s. what will 1 give? Multiply and divide, and you shall finde 6 s. 6 d. so much is 1 l. worth.

6 If one pound of Saffron do cost me 15 s. 8 d. what shall 355 l. 10 ounces cost me

me by the same price? Answer, Say by the Rule of Three, if $\frac{1}{2}$ X $18\frac{1}{3}$ $355\frac{1}{2}$. Multiply and divide, and you shall find 331 l. 18 s. 4 d. so much are the 355 l. 10 ounces worth.

Brief Rules of Weight.

WHo that multiplieth the pence that 1 pound weight is worth, by 5, and divideth the product thereof by 12, he shall find how many pounds in mony the quintal is worth, that is to say, how much the 100 pound weight is worth.

And contrariwise, he that multiplieth the pounds of mony that the 100 l. weight is worth, by 12, and divideth the product by 5, shall finde how many pence the pound weight is worth.

Example.

At 17 d. the pound weight, what is the 100 pound weight worth?

Answer. Multiply 17 by 5, and thereof cometh 85, divide the same by 12, and you shall finde 7 l. $\frac{1}{12}$ in mony, which $\frac{1}{12}$ is worth 1 s. 8 d. So much is 100 l. weight worth.

More, at 13 l. the 100 l. weight, what is 1 l. weight worth?

Answer. Multiply 13 by 12, and thereof

cometh

meth 156: the which divide by 5, and you shall finde 31 pence $\frac{1}{5}$, which is 2 s. 7 d. $\frac{1}{5}$ and so much is 1 l. weight worth.

The like is to be done of yards, ells, or any other measure, when we reckon but 100 to the C.

Brief Rules for Measure.

He that multiplieth the pence that 1 is worth by 2, and divideth the product by 4, he shall find how many pounds in number the 120 ells are worth, which 120 ells we count but for a Hundred in this place, because of worth, which measure is used for cloths only.

Or otherwise, if you divide the pence that 1 ell is worth by 2, you shall have in your quotient the pounds that the said 120 ells are worth, and if any thing remain, they are parts of a pound.

And contrariwise, he that multiplieth the pounds in money that the 120 ells are worth, by 4, and divideth the offcome by 2, shall finde how many pence the ell is worth.

Or otherwise, if you multiply the pounds that 120 Ells are worth, by 2, you shall find in the product how many pence one Ell is worth.

Example.

Example.

At 10d. the ell, what are 120 ells worth? Answer. Multiply 10 d. by 2, and there cometh 20. The which divide by 4, and you shall finde 5 l. so many pounds in money are 120 ells worth, at 10 d. the ell.

Or otherwise, divide 10 d. by 2 d. and thereof cometh into your quotient 5: which 5 doth represent 5 l. and so many pounds are the 120 ells worth, as before.

More, at 9 l. the 120 ells, what is 1 ell worth? Answer. Multiply 9 l. by 4, and thereof cometh 36, the which divide by 2, and you shall find 18 d. so much is one ell worth.

Or otherwise, if you multiply 9 l. which is the price that the 120 ells are worth, by 2, you shall have in the product 18, which 18 doth signifie the pence that 1 ell is worth, when the 120 ells do cost 9 l. as before.

The like is to be done of all manner of Wares, which are sold after 120 to the Hundred.

Rules of our Hundred weight here at London, which is after 112 lib. for the C.

He that multiplieth the d. that 1 l. weight is worth by 7, and diuideth the product by 15, shall finde how many pounds in money the 112 l. weight is worth.

And contrariwise, he that multiplieth the pounds in money that 112 l. is worth by 15, and diuideth the product by 7, shall find how many pence 1 l. weight is worth.

Example.

At 9 d. the pound weight, what is the 112 pound weight worth? Answ. Multiply 9 d. by 7, and thereof cometh 63, the which diuide by 15, and you shall find 4 l. $\frac{3}{15}$, which being abbreuied is $\frac{1}{5}$ of a pound, being worth 4 s. And thus the 112 l. is worth 4 l. 4 s. after the rate of 9 d. the l.

At 8 l. the 112 l. weight, what is 1 l. weight worth? Answ. Multiply 8 l. by 15, and thereof cometh 120, the which diuide by 7, and you shall finde 17 d. $\frac{1}{7}$, so much is 1 l. weight worth, when the 112 l. is worth 8 l.

CHAP

CHAP. VIII.

Of Tares and Allowances of Merchandize sold by weight.

1 AT 12 l. the 100 suttel, what shall 987 l. suttel be worth? In giving 4 pound weight upon every 100 for tret? Ans. Adde 4 l. unto 100, & you shall have 104. Then say by the Rule of Three, if 104 be worth 12 pound, what are 987 pound weight worth? Multiply and divide, and you shall find 113 l. $\frac{1}{26}$ which is worth 17 s. 8 d. $\frac{4}{13}$. So much shall the 987 l. weight be worth.

104 | 12 | 987.

2 At 6 s. 8 d. the pound weight, what shall 345 l. $\frac{1}{2}$ be worth in giving 4 l. weight upon every 100 for the tret? Answer, Sir first by the Rule of Three, what the 100 l. is worth, saying, if $\frac{1}{1}$ X 6 $\frac{2}{3}$ $\frac{100}{1}$. Multiply and divide, and you shall find 33 l. $\frac{1}{3}$, then adde 4 l. unto 100, & they are 104, then say again by the Rule of Three, if 104 l. be sold for 33 l. $\frac{1}{3}$, for how much shall 345 $\frac{1}{2}$ be sold? Multiply and divide, and you shall finde 110 l. 14 s. 8 pence $\frac{1}{x}\frac{1}{3}$. For so much shall the 345 $\frac{1}{2}$ be sold, at 6 s. 8 d. the pound

pound, in giving 4 upon the hundred.

3 More, if 100 l. be worth 36 s. 8 d. what shall 780 l. be worth, in rebating 4 l. upon every 100, for tare and cloffe? Answer: multiply 780 by 4, & thereof cometh 3140. The which divide by 100, and you shall have 31 l. $\frac{1}{5}$: abate 31 $\frac{1}{5}$ from 780, & there will remain 748 $\frac{4}{5}$. Then say by the Rule of 3, if $\frac{100}{1}$ do cost 36 $\frac{2}{3}$, what will 748 $\frac{4}{5}$ cost after the rate? Multiply and divide, so shall you find 274 s. 6 d. $\frac{18}{19}$, and so much shall the 780 l. cost, in rebating 4 l. upon every 100, for tare and cloffe.

4 More, whether he doth lose more that giveth 5 l. upon the 100, or he that rebateth 5 l. in the 100 for tare and cloffe? Answ. First note, that he which giveth 5 l. upon the 100, giveth 105 for 100: and he which rebateth 5 l. in the 100, giveth the 100 for 95: Therefore say by the Rule of Three, if 105 be given for 100, for how much shall the 100 be given? Multiply and divide, and you shall finde 95 $\frac{5}{21}$ and he which rebateth 5 in the 100, maketh but 95 of a 100: so that he loseth 5 in the 100, and the other which giveth 5 upon the 100, loseth but 4 $\frac{16}{21}$ upon the 100. Thus you may see that he which rebateth 5 in the 100 loseth more by 4 in the 100, than the other which gave

5

5 upon the 100 for Tare and Cloffe.

5 If 100 l. of Allom do cost me 26 s. 8 d. how shall I sell the pound weight, to gain after the rate of 10 upon the 100? Answ. Put 26 shillings 8 pence all into pence, and you shall have 320 pence. Then say by the Rule of Three, if 100 gibe 110, what shall 320 gibe? Multiply 320 by 110 and dibide the product by 100, and you shall finde 352 pence. Then say again, if 100 pound be worth 352 pence, what is 1 pound worth? Multiply and dibide, and you shall have 3 d. $\frac{16}{50}$, which $\frac{16}{50}$ is worth $\frac{1}{3}$ and $\frac{1}{25}$ of $\frac{1}{3}$, that is to say, the pound weight shall be worth 3 d. $\frac{1}{3}$, $\frac{1}{25}$, of a half peny for gaining 10 upon the 100.

6 If 1 pound weight do cost me 6 s. 10 d. and I sell the same for 7 s. 2 d. I demand how much I shall gain upon the 100 l. of mony after the rate? Answ. Say by the Rule of Three, if 6 $\frac{5}{6}$ yield 7 $\frac{1}{6}$, what will $\frac{100}{1}$ yield? Put the whole numbers into their broken, then multiply and dibide, and you shall finde 104 $\frac{36}{41}$, from the which substract 100, and there resteth 4 s. $\frac{36}{41}$, so much is gained upon the 100 pound of mony after the rate.

7 More, If 1 pound do cost me 5 s. 4 d. and I sell the same again for 4 s. 9 d. I demand

demand how much I shall lose upon the wool. of mony? Answer. Say, if $5\frac{1}{2}$ do give but $4\frac{3}{4}$ what shall $10\frac{1}{2}$ give? Put the whole number into their broken, then multiply and divide, and you shall find $89\frac{1}{10}$ the which you must subtract from 100, and there will remain $10\frac{9}{10}$ so much is lost upon the 100 l. of mony.

8 Mory, if the pound weight do cost me 3 s. 2 d. and I sell it again for 4 s. 4 d. how much shall I gain upon 20 s. Answer. Say, if $3\frac{1}{6}$ give $4\frac{1}{3}$, what shall $20\frac{1}{2}$ give? Multiply and divide, and you shall find 27 s. from the which abate 20 s. and there will remain 7 s. $\frac{7}{27}$, which is 4 d. $\frac{8}{19}$ and so much is gained upon the pound of mony, that is to say, upon 20 s.

9 If the pound weight do cost me 4 s. 6 d. and I sell it again for 3 s. 2 d. I demand how much I shall lose in the pound of mony? that is to say, in 20 s. Answer. Say, $4\frac{1}{2}$ give but $3\frac{1}{6}$, what will $20\frac{1}{12}$ give? multiply and divide, and you shall find 14 s. $\frac{8}{12}$, the which you must abate from 20 s. and there will remain 5 s. $\frac{4}{12}$ which $\frac{4}{12}$ is worth 4 d. $\frac{4}{12}$ of a peny, and so much is lost upon the pound of mony.

CHAP. IX.

Of certain Questions done by the double Rule, and also by the Rule of Three composed.

10 A Merchant hath sold Wines for the sum of 300 pounds, and he hath gained therein after 10 pound upon the 100 pound. The Question is, to know how much hee gained in all? Answer. Say by the Rule of Three, if 110 pound do gain 10 pound, what will 300 l. gain: multiply and divide, and you shall find 27. $\frac{3}{11}$, and so much hath he gained in all.

11 A Merchant hath bought a piece of Hamshire Kersey, containing 18 yards, for the price of 4 l. 10 s. The question is, to know how many yards he shall sell for 33 s. 4 d. to gain 20 s. in the whole piece? Answer. Adde 20 s. unto 4 l. 10 s. & they make 5 l. 10 s.. Then say by the Rule of Three, if 5 l. $\frac{1}{2}$ do yield me 18 yards, what will 1 l. $\frac{2}{3}$ yield? multiply and divide, and you shall find 5 yards, $\frac{5}{11}$. And so many yards shall he sell to gain 20 s. in the whole piece.

12 A Merchant hath sold Sugars for the sum of 600 l. ready mony, and he hath gained

gained in the whole, the ſum of 60 pound. The queſtion is, to know how much he hath gained upon the 100 l. Anſwer. Firſt, you muſt ſubſtract 60 l. from 600 l. and there will remain 540 l. Then ſay by the Rule of Three, if 540 l. do gain 60 l. what will 100 l. gain? multiply and divide, and you ſhall find 11 l. $\frac{1}{9}$. And ſo much had he gained upon the 100 l.

13 Moze, if 1 l. weight of Maces do coſt me 5 s. 10 d. and afterward I do ſell the ſame foz 6 s. the pound, to be paid foz it at the end of 3 months: I demand how much I ſhall gain upon 100 l. in 12 months, after the rate? Anſwer. Say by the firſt part of the rule of three compoſed, if 5 ſhillings $\frac{5}{6}$ in $\frac{1}{4}$ months do gain $\frac{1}{6}$ of a ſhilling, which is the what $\frac{100}{1}$ l. gain in $\frac{12}{1}$ months? multiply and divide, and you ſhall find 11 l. $\frac{5}{7}$. And ſo much ſhall I gain in 12 months after the rate.

14 Moze, if a piece of Kerſey do coſt 35 s. foz what pzice may I ſell the ſame, to be paid foz it at the end of 3 months, ſo that I may gain thereby after the rate of 10 l. upon the 100 l. in 12 months? Anſwer by the firſt part of the Rule of Three compoſed, if 100 pounds in 12 months do gain 10 l. what will 36 s. gain in three

months? multiply and divide, and you ſhall find $\frac{10}{1}\frac{80}{230}$ of a ſhilling, the which being abbredied, doth make $\frac{2}{9}$ of a ſhilling, which is worth 10 d. $\frac{4}{9}$ the ſame you muſt adde with 16 s. and then ſhall you have 36 s. 10 d. $\frac{4}{9}$. And for that price I muſt ſell the piece of Kerſey, for to gain therein 10 l. upon the 300 l. in 12 months, and giving 3 months time for the payment.

15 More, if 6 yards of Northern Kerſey do coſt me 8 s. and I ſell 4 yards of the ſame Kerſey for 6 s. I demand whether I gain or loſe, and how much upon a 100 l. of mony? Anſw. Firſt, you muſt ſeek what the 4 yards of Kerſey did coſt: ſaying by the Rule of Three, if 6 yards do coſt 8 s. what will 4 yards coſt? Multiply and divide, and you ſhall find 5 s. $\frac{1}{3}$, and ſo much did the ſaid 4 yards coſt, therefore abate the ſame 5 $\frac{1}{3}$ from 6 s. and there will remain $\frac{2}{3}$ of a s. which $\frac{2}{3}$ is gained in the ſame 4 yards of Kerſey. Then ſay again by the Rule of Three, if 5 $\frac{1}{3}$ do gain $\frac{2}{3}$, what will $\frac{2}{3}$ gain? Multiply and divide, and you ſhall finde 12 and $\frac{8}{16}$, which $\frac{8}{16}$ being abbredied is $\frac{1}{2}$. Therefore it appeareth that I ſhall gain 12 l. $\frac{1}{2}$ upon the 100 l. in ſelling 4 yards of the ſaid Kerſey for 6 s.

16 More, a Merchant hath bought

piece of Damask which cost him 8 s. the yard ready mony, and he selleth the same again to another Merchant for 10 s. the yard, but he giveth two days for the paiment, that is to say, 2 months for one half, and 5 months for the other half. The question is, to know how much the said first Merchant doth gain upon 100 l. in 12 months, after the rate aforesaid? Answer. you must adde the two months and the five months both together, and they make 7 months, whereof you must take the one half, which is $3\frac{1}{2}$ months. And at that time the second Merchant ought to have paid the whole, at one entire paiment. And therefore say by the first part of the Rule of Three composed, If $\frac{8}{1}$ in $3\frac{1}{2}$ months, do gain $\frac{2}{1}$ s. what will $\frac{10}{1}$ gain in $\frac{12}{1}$ months? multiply and divide, and you shall finde 51. $\frac{5}{7}$. And so much doth the first Merchant gain upon the 100 in 12 months.

17 A Merchant hath bought Velvet at 3 s. 9 d. the yard ready mony, and he selleth the same for 14 s. 3 d. the yard, to be paid $\frac{1}{3}$ part in ready mony, $\frac{1}{4}$ part at three months, and the rest which is $\frac{5}{12}$, is to be paid to him at 5 months. The question is, to know how much the first Merchant doth gain upon the 100 l. in 12 months, after

the same rate? Answer. See first at what time all the paiments ought to be paid at once: and for to know the same, you must multiply every several paiment, by the time it ought to be paid, and adde them together, then divide the product by the total summe of all the paiments being added together, and your quotient will shew at what time all the paiments ought to be paid at once, as in the former example: $\frac{1}{4}$ part in ready mony is not multiplied by any time, because it is paid presently, then $\frac{1}{4}$ part being multiplied by 3 months, maketh $\frac{3}{4}$ of a month, and the rest being $\frac{1}{2}$ multiplied by 5 months, bringeth $2\frac{1}{12}$, then adde $\frac{3}{4}$ and $2\frac{1}{12}$ together, & they make 2 months $\frac{5}{6}$, the which is the just time that all the paiments ought to be paid at once. And therefore say by the first part of the Rule of Three composed, If $13\frac{1}{3}$ in 2 months $\frac{1}{4}$ do gain $\frac{1}{4}$ of a pound, what will 100 l. gain in 12 months after the rate? multiply and divide, and you shall finde 23 l. $\frac{9}{17}$. And so much doth he gain upon the 100 l. in 12 months.

18 A Merchant hath bought Fustians, which cost him 22 s. 6 d. the piece ready mony, and he will sell the same at 24 s. the piece. The question is, to know what time he

he ought to gibe fr3 the paiment of the lame, to the end he may gain after 9 l. upon the 100 l. in 12 months? Anſwer. Say, if 22 $\frac{1}{3}$ do gain 1 $\frac{1}{3}$: what will $\frac{10}{1}$ gain? multiply and dibide, and you ſhall find 6 $\frac{2}{3}$ of gain. Then ſay again by the Rule of Three, if $\frac{9}{1}$ of gain do require $\frac{12}{1}$, what will 6 $\frac{2}{3}$ of gain require? multiply and dibide, and you ſhall find 8 $\frac{8}{9}$, which is 8 months and $\frac{8}{9}$, and ſo long time ought he to gibe, to gain after the rate of 9 l. upon the 100l. in 12 months.

19 A Merchant hath bought a piece of Satten, being in length 20 yards, which did coſt him 12 pounds and 10 s. ready mony, I demand foz what pzice he ſhall ſell the yard, to be paid at the end of 2 months, ſo that he may gain after the rate of 10 l. upon the 100 l. in 12 months? Anſ. See firſt what the yard did coſt him at the firſt: ſaying by the Rule of Three, if 20 yards coſt 12 l. 10 s. what will 1 yard coſt? multiply and dibide, and you ſhall find 12 s. and 6 d. Then ſay again by the Rule of 3, if 12 months do gibe me 10 l. what will 2 months gibe? multiply and dibide, and you ſhall find 1 l. $\frac{2}{3}$. Adde therefoze the ſaid 1 $\frac{2}{3}$ unto 100. & they are 101 $\frac{2}{3}$. Say therefoze once again by the Rule of Three,

if $\frac{06}{1}$ do gibe me 101 $\frac{2}{3}$, what will 12 gibe? Multiply and dibide, and you shall finde 12 s. and $\frac{17}{34}$ which is woꝛth 8 d. $\frac{1}{30}$ and so 12 s. 8 d. $\frac{1}{2}$. must be sell the yard of Satten gibing 2 months time foꝛ the paiment, to gain after the rate of 10 l. upon the 100 l. in 12 months.

20 Woꝛe, if 1 l. weight of Cinamen do cost me 8 s. ready mony, foꝛ what pꝛice shall I sell 100 l. weight of the same, to be paid the $\frac{1}{4}$ at 1 month, and the resioue at the end of 3 months; so that I may gain after 9 l. upon the 100 l. in twelue months after the rate? Answer. Seek first in how long time, both the paiments should bee made at once.

$\frac{1}{4}$ $\frac{1}{1}$ $\frac{1}{4}$
$\frac{3}{4}$ $\frac{3}{1}$ 2 $\frac{2}{4}$.

2 $\frac{1}{2}$ month.

The way to do, you must multiply each paiment of mony, by the time when it ought to be paid, that is to say, you must multiply the first paiment, which is $\frac{1}{4}$ part by $\frac{1}{1}$ month, & thereof cometh $\frac{1}{4}$ of a month. Likewise you must multiply the nexꝛ paiment which is $\frac{3}{4}$ by 3 months, and thereof will come 2 months $\frac{1}{4}$. Then adde $\frac{1}{4}$ of a month, and two months $\frac{1}{4}$ both together, and they make two months $\frac{1}{2}$, which is the time that both the paiments ought to be

paid

paid at once. Then say by the Rule of Three, if 12 months do gibe 9 l. what will 2 months $\frac{8}{3}$ gibe? Multiply and dibide, and you shall find $1\frac{2}{8}$. Say again by the Rule of Three, If 1 l. weight do cost me 8 s. what will 100 l. cost? Multiply and dibide, and you shall find 40 l. Then say once again, if $\frac{100}{1}$ do gibe $101\frac{7}{8}$, what will $\frac{40}{1}$ gibe? Multiply and dibide, and you shall finde $40\frac{3}{4}$. And for 40 l. 15 s. I must sell 100 l. weight of Cinnamon, to be paid at the 2 several times aforesaid, to gain therein after the rate of 9 l. upon the 100 l. in 12 months, as by example aforesaid.

20 When the quarter of Wheat doth sell 6 s. 8 d. the loaf of Bread weighing 20 ounces, is sold for a half peny. I demand that if the quarter of Wheat did cost ten shillings, for how much shall the loaf of Bread be sold, that weigheth 16 ounces? You shall answer by the first part of the Rule of Three composed, which is mentioned in the second Chapter of the third part of this Book, where you must say by the same first part of the Rule of Three composed, if $6\frac{2}{3}$ | $\frac{20}{1}$ | $\frac{1}{2}$ | $\frac{10}{1}$ | $\frac{16}{1}$.

Then multiply the first number by the second, and the product thereof shall be your Dibisor. Likewise multiply the other three

three numbers the one by the other, and the product thereof ſhall be your dividend: as thus, firſt multiply $6\frac{2}{3}$ by $\frac{20}{1}$, and thereof cometh $\frac{400}{3}$ for your diviſor, then multiply $\frac{1}{3}$ by $\frac{10}{1}$, and the product thereof by $\frac{16}{1}$, ſo you ſhall have $\frac{160}{3}$ for your number that is to be divided, then divide $\frac{160}{3}$ by $\frac{400}{3}$, and thereof cometh $\frac{480}{800}$, the which being abbreviated, bringeth $\frac{3}{5}$ of a peny: and for that price muſt the loaf of bread be ſold, which weigheth 16 ounces, when the quarter of wheat is worth 10 s.

Or otherwiſe by the Rule of Three at two times. Firſt ſay, if $\frac{20}{1}$ ounces give $\frac{1}{3}$, what will $\frac{16}{1}$ ounces give? multiply and divide, and you ſhall find $\frac{2}{5}$ of a peny, then ſay again, if $6\frac{2}{3}$ do give me $\frac{2}{5}$, what will $\frac{10}{1}$ give? multiply and divide, and you ſhall find $\frac{3}{5}$ of a peny, as before is ſaid.

21 When the carriage of one hundred weight of Merchandize 50 miles doth coſt 5 s. what ſhall the carriage of 500 weight coſt me for 16 miles? Anſwer. By the firſt part of the rule of 3 compoſed, ſaying, if 100 50 ſi 500 16, multiply 100 by 50, the product will be 5000, which ſhall be your diviſor. Then multiply 5 times 500 by 16, and thereof cometh 40000 for your dividend. Therefore divide 40000 by 5000, and you ſhall

ſhall finde 8 s. ſo much ſhall coſt the carriage of 500 weight 16 miles.

Or otherwiſe by the double Rule of 3, that is to ſay, by the Rule of 3 at 2 times: firſt ſay, if 50 miles do pay 5 s. what ſhall 16 miles pay? Multiply and divide, and you ſhall finde 1 s. $\frac{3}{5}$. Then ſay again, if 100 weight do coſt me 1 s. $\frac{3}{5}$, what ſhall 500 weight coſt? multiply and divide, and you ſhall find 8 s. as before.

22 When the carriage of 100 pound weight of Merchandize 84 miles doth coſt me 6 s. how many miles may I have 64 pound weight carried for 3 s. 4 d? Anſw. By the ſecond part of the Rule of Three compoſed, and ſay, if $\frac{100}{1}|\frac{84}{1}|\frac{6}{1}|\frac{64}{1}|3\frac{1}{3}$. Then multiply the fourth number $\frac{64}{1}$ by the third number $\frac{6}{1}$, and thereof cometh $\frac{384}{1}$ for your diviſor. Likewiſe multiply $3\frac{1}{3}$ by $\frac{100}{1}$, and by $\frac{84}{1}$, and you ſhall have in the product $\frac{8400}{3}$ then divide $\frac{8400}{3}$ by $\frac{384}{1}$ and you ſhall finde 72 miles, and $\frac{1}{12}$ of a mile. So many miles ſhall the 64 pound weight be carried for 3 s. 4 d.

Otherwiſe by the Rule of Three at two times: Firſt ſay, if 100 weight do coſt me 6 d. what will 94 pound weight coſt? multiply and divide, & you ſhall finde 3 s. $\frac{21}{25}$. Then ſay, if 3 $\frac{21}{25}$ be paid for 94 miles

carri-

carriage: for how many miles shall 3 ℔ be paid? Multiply and divide, and you shall find 72 miles $\frac{11}{13}$, as before.

23 If 100 Horses, in 100 Days, do spend 180 Quarters of Oats: how many Quarters of Oats will 350 Horses spend in 150 Days? Answer. By the first part of the Rule of Three composed, you must multiply 180 times 350, by 150: and divide the product by 100 times 100: and you shall finde 945 Quarters. So many Quarters of Oats will 350 Horses spend in 150 Days. Or otherwise by the Rule of Three at two times. First say, if 100 days do yield me 180 Quarters of Oats, what shall 150 days yield? Multiply and divide, and you shall find 270 Quarters: then say again, if 100 Horses do spend 270 Quarters of Oats, how many quarters of Oats will 350 Horses spend? Multiply and divide, and you shall find 945 Quarters, as before.

CHAP. 10

Of the Rule of Fellowship, without any time limited.

THe Rule of Fellowship is thus, you must set down each mans sum of mony, that he layeth into company, every one directly under the other, the which sums you shall adde all together, and the total sum of all their whole stocks being thus assembled, shall be your common divisor, to the finding out of every mans part of the gain. Then you shall multiply either the gain, or else the loss, which soever of them do happen, by each mans portion of mony that he laid in, and divide the products by the said divisor: so shall you have in your quotient every mans part of the gain, if any thing be gained, or else of the loss, if any thing be lost.

Example.

1 Two Merchants have laid their mony in company together: the first laid in 500 l. The second laid in 300 l. and with trading they have gained 64 l. I demand how much each man shall have of the same gains, according to the mony that he laid in? Answer. Adde 500, and 300 both together,

ther, which are the parcels or sums that they both laid in, and thereof cometh 800 for your diuisor: then say by the Rule of Three, if 800 l. which is the whole stock, do gain 64 l. what shall 500 l. gain? (which is the first mans mony that he laid in) multiply and diuide, and you shall finde 40 l. for the first mans part of the gain: then say, if 800 gibe 64, what will 300 gibe? multiply and diuide, and you shall finde 24 l. for the second mans part of the gain

500 l
300 800 | 64 | 500.
800
800 | 64 | 300

Or otherwise, put 500 pound which is the first mans mony that he laid in, ouer the 800 l. which is the whole stock, and you shall haue $\frac{500}{800}$, which being abbreuied, do make $\frac{5}{8}$, and such part of the gain shall the first man take, that is to say, $\frac{5}{8}$ of 64 pound, which is 40 l. And consequently by the same manner the second shall take the $\frac{3}{8}$ of 64. which is 24 pound, for his part of his gain, as before.

5

5 | 00 | 1 | 3 | 00

8 | 00 | 1 | 8 | 00

2 Two Merchants have companied together, the first laid in 640 l. and he taketh $\frac{5}{8}$ parts of the gain, I demand how much the second Merchant laid in? Answer. Seeing that the first Merchant taketh $\frac{5}{8}$ of the gain, it follows that the second Merchant must have $\frac{3}{8}$ which is the rest, and therefore say by the Rule of Three, if $\frac{5}{8}$ of the gain which the first man taketh, did lay into the stock $\frac{640}{1}$. How much shall $\frac{3}{8}$ of the gain lay in, which is the second mans gain? multiply and divide, and you shall find 384 l. how much ought the second man to lay into company.

3 Two Merchants have companied together, the first man laid in 640 l. and the second hath laid in so much mony for his part, that he must have 60 l. for his part of 100 l. that they have gained. I demand how much the second man did lay into company? Answer. Seeing that the second man taketh 60 l. of the gain, it followeth that the first must have the rest of the 100 l. which is but 40 pound. Therefore say by the Rule of Three, if 40 l. do lay in 640 l. what shall 60 l. lay in? Multiply and divide

bide. and you shall find 960 l. so much the second Merchant lay in.

4 Two Merchants have companied together. The first laid in 83 l. 6 s. 8 d. The second laid in 170 Duckets, and they have gained 100 l. of the which the first man must have 60 l. I demand what the Ducket was worth? Answer. Seeing that the first man must have 60 l. it followeth that the second must have 40 l. Therefore say by the Rule of Three, if 60 l. of gain that the first man taketh, did lay in 83 l. 6 s. 8 d. principal, how much shall 40 l. gain put in, which is the gain that the second man taketh? Multiply and divide, and you shall find 55 l. $\frac{5}{5}$. so much are the 170 Duckets worth. Then put 55 l. $\frac{5}{5}$ into shillings, and you shall have 1111 s. $\frac{1}{5}$. So then for to know what the Ducket is worth, Say by the Rule of Three, if the $\frac{170}{1}$ give 1111 $\frac{1}{5}$ what will $\frac{1}{1}$ give? multiply and divide, and you shall finde 6 s. 6 d. $\frac{21}{34}$, so much is the Ducket worth.

5 Two Merchants have companied together. The second man laid in more by 30 l. than did the first man, and they gained 120 l. of the which the first man ought to have 50 l. I demand what each of them did lay in? Answer. From 120 l. abate

50 l.

and there resteth 70 l. for the second mans part: so that by this means the first man (because he laid in 30 l. more than the first man did) he taketh 20 l. more of the gain, and therefore lay by the Rule of Three, if 20 l. gain did lay in 30 l. principal, how much shall 50 l. gain lay in? multiply and divide, and you shall find so much did the first man lay in, and consequently the second laid in 100 l.

Two Merchants have companion together, the second hath laid in twice so much as the first man did, and 20 l. more, & they have gained 100 l. of this which the first ought to have 32 l. for his part: I demand how much each of them did lay into company? Answ. If it were not for the 20 l. the second man laid in more than the first, he should have had but 64 l. for the which is the double of the first mans part. But because he laid in 20 l. more, he hath therefore 41. more of the gain, and therefore lay by the Rule of Three, if 40 l. did lay in 10 l. of principal (which is above the double of the mans layings in) what shall 32 l. of gains lay in, which is the first mans part of gains that he taketh? multiply and divide, and you shall find 80 l. for the first

mans laying in: and so consequently 170 l. for the second mans portion that he laid in.

7. Two Merchants have companied together, and they have gained 100 pound, of the which the first must have after the rate of 10 l. upon the 100 l. and the second must have after the rate of 15 l. upon the 100 l. I demand how much each of them ought to have? Answ. Put 10 l. for the first mans laying in, and 15 l. for the second mans laying in. Adde therefore 10 l. and 15 l. together, and they make 25 l. Then put 10 over 25, and it is $\frac{10}{25}$, which being abbrevied are $\frac{2}{5}$. Therefore he that taketh 10 l. upon the 100 l. must have the $\frac{2}{5}$ of the gain which is 40 l. Then put 15 over 25, and it is $\frac{15}{25}$, which being abbrevied are $\frac{3}{5}$. Therefore the second must have $\frac{3}{5}$ of the 100 l. which is 60 l.

8. Two Merchants have companied together. The first laid in 46 l. 18 s. and the second laid in 33 l. 2 s. so they have gained 30 l. I demand how much each man shall have for his part of the gain? Answ. Adde 46 pound 18 shil. and 33 l. 2 s. together, and you shall finde 80 l. for your common divisor: then say, if 80 l. which is al their stock do gain 30 l. what is 46 $\frac{9}{10}$ gain, which is the mony that

[illegible] man laid in? multiply and divide, and you shall finde 17 l. 11 s. 9 d. for the first [illegible] part of the gain. Then say again by the Rule of Thrée, if 80 l. do gain [illegible] l. what will 33 $\frac{1}{16}$ gain, which was the second mans mony that he laid in? multiply and divide, and you shall find 12 l. 8 s. 3 d. for the second mans part of the gain.

And after the same manner shall you do, [illegible] that there were 3 or 4 Merchants that would company together. Adding all [illegible] every of their sums of mony (which they lay into the stock) into one total sum, which shall be your common divisor: and then work with the rest, as is taught in the former question of the Rule of Company.

Example.

If Thrée Merchants have companied together, the first laid in I know not how much: the second did put in 20 pieces of cloath: and the third hath laid in 500 l. [illegible] at the end of their company, their [illegible] amounteth unto 1000 l. whereof the [illegible] man ought to have 350 l. and the second must have 400 l.

Now I demand how much the first [illegible] did lay in, and for how much the 20 [illegible] of cloath were put into company?

Answ. Seeing that the first, and the second Merchants must have 750 l. for their part of the gain; Then the third man must have the rest of the 1000 pound, which is 250 pound. And therefore say by the Rule of Three, if 250 pound gain, become of 500 pound principal, of how much shall come 350 pound gain, which the first man taketh? multiply and divide, and you shall finde 700 pound. So much did the first man lay in: then say, if 250 pound gain, become of 500 pound principal, of how much shall come 400 pound, which is the gain that the second man taketh? multiply and divide, and you shall find 800 l. For that price were the twenty pieces of Cloath laid into company.

10 Three Merchants have gained 100 pound: The first must have the $\frac{1}{2}$: The second must have the $\frac{1}{3}$: And the third must have the $\frac{1}{4}$. I demand how much each man must have of the gain? Answer. Reduce $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, into a common denomination, after the order of the second Reduction in Fractions, and you shall find $\frac{12}{24}$ for the $\frac{1}{2}$, $\frac{8}{24}$ for the $\frac{1}{3}$, and $\frac{6}{24}$ for the $\frac{1}{4}$. Then take 12 for the first mans laying in, 8 for the second mans laying in, and 6 for the third mans laying in. The whole

these numbers being added together, shall be your common divisor, and they do make 26. Then multiply 100 l. by 12, for the first man: then again 100 l. by 8, for the second: and last of all 100 l. by 6, for the third man. And divide the products of every multiplication by 26. So shall you find 46 l. $\frac{2}{13}$ for the first mans part of the gain: 30 l. $\frac{10}{13}$ for the second mans part, and 23 l. $\frac{1}{13}$ for the third mans part.

11 Two Merchants have gained 100 pound. The first must have $\frac{1}{2}$ and 5 pound more, the second must have $\frac{1}{3}$ and 4 l. more. I demand how much each of them shall have? Answ. First, from 100 abate 5, and 4, which are 9, so there will remain 91, then take the $\frac{1}{2}$ of 100 l. which is 50 l. for the first mans laying in. Likewise take $\frac{1}{3}$ of 100 l. for the second mans laying in, which is 33 l. $\frac{1}{3}$. Then adde 50 l. and 33 l. $\frac{1}{3}$ together, and you shall have 83 l. $\frac{1}{3}$ for your common divisor: then multiply 91 l. by 50, and divide by 83 $\frac{1}{3}$, & thereof cometh 54 l. $\frac{3}{5}$, unto the which number adde 5, and all is 81 l. $\frac{3}{5}$ for the first mans part of the gain. Likewise multiply 91 by 33 $\frac{1}{3}$, and divide by 83 $\frac{1}{3}$ and you shall find 36 l. $\frac{3}{5}$ unto the which adde 4, and you shall have 40 l. $\frac{3}{5}$ for the second mans part.

12 Two Merchants have gained 100 l. The first must have the ½ less by 4 l. The second must have ⅓ less by 2 l. I demand how much each of them shall have? Answ. Abate 4 and 2 with 100, and they make 106. Then take as before is said 50 l. for the first man: and 33 ⅓ for the second, and adde them both together, and they be 83 ⅓ which shall be your divisor. Then multiply 106 by 50, and divide the product by 83 l. ⅓, so thereof commeth 63 l. ¾. From the which abate the 4 l. less that the first man taketh, and then is there remaining 59 l. ¾ for his part. Likewise multiply 106 by 33 ⅓, and divide by 83 ⅓, and you shall find 42 l. ¾, from the which abate 2 l. less, and there remaineth 40 l. ¾ for the second mans part.

The Rule of Fellowship, with time.

THe money that every man layeth in must be multiplied by the time that it continueth in company, and of that which cometh thereof, you shall make their new layings in for each of them: and then multiply the gains by every one of them severally, and the off-comes you shall divide by all their new layings in added together, and then you shall have proportionally, of

mans part of the gain according to his laying in.

Example.

1 Two Merchants have companied together: The first hath put in the 1 of January, 450 l. The second did lay the 1 of May, 750 l. And at the years end, they had gained 100 l. I demand how much each of them shall have of the gain.

Answer. For as much as the first did put 450 l. the 1 of January, his mony continued in company 12 months, and therefore multiply 450 by 12 months, and there cometh 5400 for his new laying in. And the second laid in his 750 l. but at the 1 day of May: so that his mony remained in company but 8 months. Therefore multiply his 750 l. by 8, and thereof cometh 6000 for his new laying in. Then adde 5400 with 6000, and they make 11400 for your common divisor. Then multiply 100 l. which is the gains, by 5400, and divide the product by 11400, and thereof will come $47\frac{7}{19}$ for the first mans part of the gain. Likewise multiply 100 by 6000, & divide the product by 11400, and you shall find $52\frac{12}{19}$: and so much must the second man have for his part of the gain.

2 Two Merchants have companied together, the first hath laid in the first of January 640 l. The second can lay in nothing until the first of April, I demand how much he shall then lay in, to the end that he may take half the gain? Answ. multiply 640 l. by 12 months, that his mony abideth in company, and thereof will come 7680 l. for his laying in. And so much ought the second man to lay in, for because he taketh of the gain. But for that that he putteth in nothing untill the 1. of April, his mony can be in company no longer than nine months. And therefore divide 7680 by 9 and thereof will come 853 l. $\frac{1}{3}$ So much ought the second Merchant to lay in the 1 of April, to the end that he may take the one half of the gains.

3 Three Merchants have companied together. The 1 laid in the 1 of March 100 l. the second laid in the 1 of June so much mony, that of the gain he must have the $\frac{1}{3}$ part, and the third laid in the 1 of November so much mony, that of the gains he must have likewise $\frac{1}{3}$, and they continued in company untill the next March following, I demand how much the second and the third Merchants did lay in? Answ. Multiply 100 l. which the first ma-

lay in, by 12 months, that his mony tinued in company, and thereof comth 1200 for his laying in, and so much ught the second and third Merchants each them to lay in, because they part the gains thirds. But for that that the second rchant layeth in nothing till the first of ne, his mony can be in company but 9 nths. Therefore divide 1200 by 9 nths, and thereof will come 133 $\frac{1}{3}$, and much ought the second Merchant to lay Then forasmuch as the third Merchant lay in nothing untill the 1 of Novem-, his mony abideth in company but the ce of 4 months. Therefore divide 1200 4, and thereof commeth 300 l. And so ch ought the third Merchant to lay into mpany.

4. Three Merchants have companied gether, the first laid in the 1 of Janua- 100 Duckets. The second hath laid 50 pound the 1 of March, and the third in a Jewel the 1 of July, and at the rs end, they had gained 400 Crowns: the which the first Merchant must have Crowns, and the second must have 80, demand what the Ducket was worth, at what price the Jewel was valued, ich the third merchant laid in? Anſw.

The

The first mans mony being 100 Duckets multiplied by 12 is 1200 Duckets by the rule aforelaid, and he taketh 50 Crowns for the gain: therefore say, if 50 Crowns gain become of 1200, which was his stock, of how much shall come 80 Crowns gain, that the second man taketh? multiply and divide, and you shall find 1920, for the second Merchants laying in. Then say again, if 50 Crowns become of 1200 stock, of how much shall come 2700 Crowns, which the third man taketh of the gain? multiply and divide, and you shall finde 6480 for the third Merchants laying in. Then divide 1920 which is the second mans laying in, by 10 months, that his mony did continue in company, and you shall finde 192 Duckets which are worth 50 l. because he laid in 50 l. Then divide 50 l. (being first reduced into shillings, by the said 192 Duckets) and thereof will come 5 shillings 2 pence $\frac{1}{2}$. So much was the Ducket worth: Finally, divide 6480 (which is the third mans laying in) by 6 months that his Jewel remained in company, and you shall find 1080 Duckets, and for that price was the Jewel put into company.

5 Three Merchants have compared

10

gether: The 1 laid in the 1 of Janu-
ary 100 l. And the 1 of April he hath
taken back again 20 l. The second hath
laid in the 1 of March 60 l. and after-
ward he did lay in more 100 l. the 1 of
August. The third laid in the 1 of July
150 l. And the 1 of October he did take
back again 50 pounds. And at the years
end, they found that they had gained
180 pounds. I demand how much every
man shall have of the gain? Answer. Mul-
tiply 100 pounds which the first man laid
in by 12 months, and thereof commeth
1200 pounds, from that number abate 9
times 20 l. which are 180 for that which
he did take back again: and there will re-
main 1020, for the first mans laying in.
Then multiply 60 which the second man
laid in by 10, and you shall have 600: unto
the which adde 5 times 100 l. for the mo-
ny he laid in more the 1 of August, which
are 500, so all amounteth to 1100 for the
second mans laying in. Afterwards mul-
tiply 150 pound, which the third man hath
laid in by 6 months, and thereof commeth
900, from the which number abate 3 times
50, and they are 150 for the mony that he
did take back again the 1 of October,
so there will remain 750, for the third

mans

mans laying in. Then proceed with the rest, as is taught in the first Question of the Rule of Fellowship with time, in adding 1020, 1100, and 750 all together, which shall be your divisor. Then multiply 1601, which is the gain by 1020, by 1100, and by 750; and divide at every time by your divisor, that is to say, by all their layings in, added together, which is 2870: so you shall find $56\frac{248}{287}$ for the first man; $61\frac{93}{287}$ for the second: and $41\frac{233}{287}$ for the third man.

6 Two Merchants have companied together. The first hath laid in 960 pound for the space of 12 months, and he ought to have 8 pound upon the 100 pound of the gain. The second hath laid in 1120 pound for the space of 8 months, and he ought to have after 12 pound upon the 100 pound of the gain.

And at the years end, they have gained 800 l. I demand how much each of them shall have of the gain? Ans. Multiply 960 that the first man did lay in by 12 months, and the product thereof multiply again by 8, and you shall have 92160, for the first mans laying in: then multiply the 1120 that the second hath laid in, by 8 months, and that which cometh thereof, you shall

multi-

multiply again by 12, and you shall finde 1075 20, for the second mans laying in. Then proceed with the rest, as in the first question of the Rule of Fellowship is declared, as in the last example I have taught you, and you shall finde 369 pound $\frac{3}{13}$ for the first man: and 430 pound $\frac{10}{13}$ for the second man.

The Rule of Company, between Merchants and their Factors.

NOte, that the estimation of the body, or person of a Factor, is in such proportion to the stock which the Merchant puteth in, as the gain of the said Factor unto the gain of the Merchant. As thus, if a Merchant doe deliver into the hands of his Factor 200 pound to imploy, and he to have half the profit, the person of the said Factor shall be esteemed to be worth 200 pound. And if the Factor do have but the $\frac{1}{3}$ of the gain, he should have but $\frac{1}{2}$ so much of the gain as the Merchant taketh, which must have $\frac{2}{3}$: wherefore the person of the Factor is esteemed but the $\frac{1}{2}$ of that which the Merchant layeth in, that is to say, 100 pound.

And if the Factor did take the $\frac{2}{3}$ of the gain,

gain, then the Merchant shall take the residue, which are $\frac{2}{3}$ of the gain: wherefore the gain of the Merchant unto that of the Factor, is in such proportion as 3 unto 2. Then if you will know the estimation of the person of the Factor, say, if 3 give me 2. what will 200 give? multiply 200 by 2, and divide by 3, so you shall find $133\frac{1}{3}$. Or otherwise, you must consider that the Factor taketh the $\frac{2}{3}$ of that which the Merchant taketh. And therefore take the $\frac{2}{3}$ of 200, and you shall find $133\frac{1}{3}$ as before: and so much is the person of the Factor esteemed to be worth.

8 And if the Merchant should deliver unto his Factor 200 l. and the Factor would lay in 40 l. and his person, to the end he might have the half of the gain: I demand for how much shall his person be esteemed?

Answer. Abate 40 l. from 200 l. and there will remain 160 l. and at so much shall his person be esteemed.

And if the Factor would take the $\frac{1}{3}$ of the gain, his person with his 40 pound shall be esteemed twice as much as the stock that the Merchant layeth in, which should have but $\frac{1}{3}$ of $\frac{1}{2}$ gain, for $\frac{1}{3}$ unto $\frac{1}{2}$ is in double proportion. Therefore double

200

pounds, and thereof commeth 400 l. from the which abate 40 l. and there will remain 360 l. But if the Factor would give onely the $\frac{1}{3}$ of the gain, that shall be but the $\frac{1}{2}$ of $\frac{2}{3}$ which the Merchant taketh; and then the estimation of his person with his laying in should be esteemed, but the half of that which the Merchant layeth in: you must therefore take the $\frac{1}{2}$ of 200 l. which is 100 l. from the which you shall abate 40 l. and the rest which is 60 l. is the estimation of his person.

If it so chance for to make traffick of 240 l. that the person of the Factor should be in such wise esteemed, that he should have but the $\frac{1}{5}$ of the gain, and yet he would have the $\frac{3}{7}$. I demand how much ready money he ought to lay in, besides his person? Answ. Seeing that his person gaineth the $\frac{1}{5}$ therefore all the whole laying in, which is 240 l. shall gain the rest, that is to say, the $\frac{4}{5}$. Now because $\frac{1}{4}$ is the $\frac{1}{5}$ of $\frac{4}{5}$, therefore his person shall be esteemed the $\frac{1}{4}$ of all the laying in. Take then the $\frac{1}{3}$ of 240 l. and you shall have 80 l. for the estimation of his person, and for because that he will have half of the gain, you shall have 80 l. with 240 l. and thereof commeth 320 l. of the which take the half, which is 160 l.

and

and from the same you shall abate the 8 and there will remain other 80 l. which he ought to lay in of ready mony, and the Merchant must lay in the over-plus, which amounteth to 160 l.

10 A Merchant hath delibered to the Factor 1200 l. to govern them in the trade of merchandize, upon such condition, that he for his service shall have the $\frac{1}{5}$ of the gain, if any thing be gained, and he shall bear the $\frac{1}{5}$ of the loss, if any thing be lost. I demand for how much his person was estéemed? Answ. Seeing that the Factor taketh the $\frac{1}{5}$ of the gain, his person ought to be estéemed as much as $\frac{1}{2}$ of the stock the Merchant layeth in, that is to say, the $\frac{1}{2}$ of 1200 which is 600 l. The reason is, for because the $\frac{1}{5}$ of the gain that the Factor taketh, is the $\frac{1}{2}$ of the $\frac{2}{5}$ of the gain that the Merchant taketh. And so the Factor his person is estéemed to be worth 600 l.

11 A Merchant hath delibered unto his Factor 1200 l. And the Factor layeth in 500 l. and his person. Now because he layeth in 500 l. and his person, it is agreed betweén them, that he shall take $\frac{2}{5}$ of the gain: I demand for how much his person was estéemed? Answ. For asmuch as the

Fac-

factor taketh the $\frac{2}{7}$ of the gain, he taketh the $\frac{2}{7}$ of that which the Merchant taketh, for are the $\frac{2}{7}$ of $\frac{5}{7}$: and therefore the Factors lying in ought to be 800 l. which is the $\frac{2}{7}$ of 12000 l. that the Merchant laid in. There rate 500 l. which the Factor did lay in from 800 l. which should be his whole stock: and there remaineth 300 l. for the estimation of his person.

If Moze, a Merchant hath delibered unto his Factor 1000 l. upon such condition, that the Factor for his pains and service, shall have the gains of 200 li. as though he had laid in so much ready money: I demand what portion of the gain the said Factor shall take? Answ. See what part 200 l. (which the Factor laid in) is of 1200, which is the whole stock of their company, and you shall find that is the $\frac{1}{6}$ such part of the gain shall the Factor

But in case, that in making their covenants, it were agreed between them, that the Factor should have the gain of 200 l. of the whole stock which the Merchant layeth in, that is to say, of the 1000 l. then should the Factor take the $\frac{1}{5}$ of the gain: for 200 l. is the $\frac{1}{5}$ of 1000.

CHAP. XI.

Of the Rules of Barter: that is to say, to change Ware for Ware, &c.

1 TWo Merchants will change their Merchandize, the one with the other. The one of them hath Cloth of 1 d. the yard, to sell for ready money, but in barter he will sell it for 8 s. 4 d. The other hath Cinamon of 4 s. 7 d. the pound to sell for ready money; I demand how he shall sell it in barter that hee bee no loser. Ans. Say, if 7 $\frac{5}{12}$ (which is the price that the yard of Cloth is worth in ready money) be sold in barter for 8 $\frac{1}{3}$, for what shall 4 $\frac{7}{12}$ be sold in barter, which 4 $\frac{7}{12}$ is the price that the pound of Cinamon is worth in ready money? reduce the whole numbers to their halves, and then multiply and divide, and you shall finde 5 s. 4 d. $\frac{12}{17}$ parts of a penny, and for so much shall hee sell the pound of Cinamon in barter.

2 TWo Merchants will barter their Merchandize the one with the other: the one of them hath Chamblets, of 2 l. 18 s. the piece to sell for ready money, but in barter hee will sell the piece for 4 l. 3 s. 4 d. the other hath fine Caps of 3 l. 5 s. 10 d. the

sell in barter. I demand what the dozen of Caps were worth in ready money? Anſ. ay, if 4 l. 3 s. 4 d. which is the ober price the piece of chamblet, become of 2 l. 18 s. d. which was the juſt price of the ſame, what ſhall come 35 s. 10 d. which is the er price of the dozen of Caps: multiply dibide, and you ſhall find 25 s. 10 d. And much are the dozen of Caps worth in dy money.

Two Merchants will change their rchandize, the one with the other: the of them hath Fuſtians of 18 s. 4 d. the to ſell for ready money, and in barter ll ſell the piece for 26 s. 8 d. The hath Tapeſtry of 25 d. the ell to ſell ready money, and in barter hee will ſell 20 d the ell; I demand which of them th, and how much upon the 100 l. of ey? Anſw. Say, if 18 s. $\frac{2}{3}$ (which is the ice of the piece of Fuſtian) bee ſold arter for 26 s. $\frac{2}{3}$ for how much ſhall ell. $\frac{1}{2}$. (which is the juſt price of the Tapeſtry) bee ſold in barter: multi- and dibide, and you ſhall find 21 d. $\frac{11}{12}$: he doth ober-ſell it but for 20 d. So that $\frac{2}{11}$ he maketh but 20 d. And therefore by the Rule of 3, if the 2 Merchant, of $\frac{2}{11}$ doe make but $\frac{20}{21}$, how much ſhall hee

lose in the $\frac{100}{1}$? multiply and dibide, and you shall find $91\frac{1}{11}$ the which being abated from 100, there will remain $8\frac{1}{11}$. And after the rate of $8\frac{1}{11}$, doth the second Merchant lose in the 100. And consequently, the first Merchant of 20 d. maketh 21 d. $\frac{2}{11}$, and therefore say again by the Rule of Three, if the first Merchant of $\frac{20}{1}$ doe make $21\frac{2}{11}$, how much shall he gain upon $\frac{100}{1}$? multiply and dibide, and you shall find 109 l. $\frac{1}{11}$. And thus the first Merchant gaineth after the rate of 9 l. $\frac{1}{11}$ upon the 100 l. of money.

Note. For your better understanding of these questions, you must note, that when one Merchant gaineth of another after the rate of 10 l. upon the 100 l. he gaineth the $\frac{1}{10}$ of his own principal, and the other which loseth after the rate of $9\frac{1}{11}$ in the 100 l. loseth the $\frac{1}{11}$ of his principal. And it may be proved thus: when one Merchant will sell his wares unto another, which wares stand him but in 100 l. and hee will sell them for 110 l. therefore he of his 100 l. maketh 110 l. and so hee gaineth after 10 l. upon the 100, which is the $\frac{1}{10}$ of his principal: the other which buyeth wares for 110 l. that cost the other but 100 l. of the 110 hee maketh but 100 l. And therefore, by the Rule of Three, if 110 bee come

10

how much shall come of 100? multiply
vide, and you shall finde 90 $\frac{10}{11}$, the
bate from 100, and there will re-
$9\frac{1}{11}$, of which is the $\frac{1}{11}$ of the princi-
that the second loseth in the 100 l. as
is said. And therefore who so that
know what one Merchant gaineth of
her, either after the rate of 10 l. upon
100 l. which is the $\frac{1}{10}$ of his principal,
se after the rate of 20 l. upon the 100 l.
ch is the $\frac{1}{7}$, or of any other part, & that
ould likewise know what part the o-
loseth of his principal, he must take
the numerator of the broken number of
hat loseth, as much as for him that
neth, then adde the numerator and the
minator (of the broken number of him
gaineth) both together, and make
of the denominator of the broken numb-
of him that loseth, & then shall you have
just part of him that loseth: as by ex-
ple of him that gaineth after 10 l. upon
100 l. which is the $\frac{1}{10}$ of his principal:
the numerator of $\frac{1}{10}$ which is 1, and
e that the numerator of the broken
ber of him that loseth, then add 1, which
e numerator of the fraction of him that
neth, with 10, which is his denomina-
& you shall have 11 for the denomina-

tage of the fraction of him that loseth. Then put 1 ober the 11, and so you shall have Thus it appeareth when one Merchant gaineth of another after 10 l. upon the 10 l. he gaineth the $\frac{1}{10}$ of his principal, and the other loseth $9\frac{1}{11}$ which is the $\frac{1}{91}$ of his principal, and if he would gain after 20 upon the 100 l. which is the $\frac{1}{5}$ of his principal, the other should lose $16\frac{2}{3}$, which is the $\frac{1}{6}$ of his principal, and so is to be understood of all other fractions.

4 Two Merchants will change their merchandize the one with the other, the one of them hath Says of 20 s. and 10 d. the piece to sell for ready mony: and in barter he will sell the piece for 23 s. 4 d. and yet he will gain more ober after 10 l. upon the 100 l. The other hath Wool of 50 shil. ℔ 100 weight to sell for ready mony. I demand how he shall sell C. of Wool in barter? Answ. Say, if 20 s. 10 d. which is the just price of the piece of Say be sold in barter for 23 s. 4 d. for how much shall 50 s. (which is the just price of the C. of Wool) be sold in barter? multiply and dibide, and you shall finde 56 s. Then for because the first Merchant will gain after 10 l. upon the 100 l. he maketh of his 100 l. 110 l. so the second Merchant ma-

her

[illegible] of 110 l. but 100 l. And therefore say [illegible] Rule of Thrie, if the second Mer-[illegible]nt of 110 do make but 100, how much [illegible]ll he make of 56? multiply and divide, [illegible] you shall finde 50 s. 10 d. $\frac{10}{11}$ of a peny, [illegible] for so much shall he sell the C of Wool [illegible] barter.

[illegible] More, two Merchants will change [illegible] merchandize the one with the other, [illegible] one of them hath Taffitie of 16 crowns [illegible] piece, to sell for ready mony, & in bar-[illegible] he will sell the piece for 20 crowns, and [illegible] he will gain moreover after the rate [illegible] 10 l. upon the 100 l. The other hath Gin-[illegible] of 3 s. 9 d. the pound weight, to sell [illegible] barter. I demand what ye pound did cost [illegible] ready mony? Ans. Say, if 20 Crowns [illegible]hich is the surprice of the piece of Taffi-[illegible], be come of 16 Crowns the just price, of [illegible] much shall come 3 s. 9 d. which is the [illegible]rprice of the pound of Ginger? multi-[illegible] and divide, and you shall finde 3 shil. Then, for because that the Merchant of Taffitie, will gain after the rate of 10 up-[illegible] the Hundred: Say, if one Hundred do [illegible] 100, what shall 3 s. give? multiply and divide, and you shall finde 3 s. 3 d. $\frac{3}{5}$, and so much did the pound of Ginger cost in ready mony.

6 More, two Merchants will change their merchandize, the one with the other, the one of them hath Worsteds at 25 s. the piece to sell for ready money, and in barter he will sell the piece for 33 s. 4 d. and yet he loseth after 10 l. in the 100 l. the other hath Wax of 3 l. 6 s. 8 d. the 100 weight to sell for ready money. I would know for what price he should sell his Wax in barter? Answ. Say, if 25 s. which is the just price of the piece of Worsted be sold in barter for 33 s. 4 d. for how much shall 3 l. 6 s. 8 d. be sold? which is the just price of C. of Wax, as it was worth in ready money: multiply and divide, and you shall find 4 l. $\frac{4}{9}$ which is 8 s. 10 d. $\frac{2}{3}$, then for because that the Merchant of Worsteds, loseth after 10 l. in the 100 l. of 100 l. he maketh but 90, and therefore say, if 90 give 100, what giveth 4 l. $\frac{4}{9}$? multiply and divide, and you shall find 4 l. $\frac{36}{81}$, which is worth 18 s. 9 d. $\frac{5}{27}$ and for so much shall he sell the 100 l. weight of Wax in barter.

7 More, two Merchants will change their Merchandize the one with the other: the one of them hath Worsteds at 5 l. 6 s. 8 d. the piece to sell for ready money, and in barter he will sell the piece for 6 l. 13 s. 4 d. and yet he loseth after 10 l. in the 100

and

the other hath Musk of 2 s. 9 d. ⅓ the pound weight to sell in barter. I demand what the pound did cost in ready money?

Answ. Say, if 6 l. ⅔, which is the ouer-price of the piece of Worsted, become of 5 l. which is the just price of the same, of how much shall come 2 s. 9 d. ⅓? multiply and diuide, and you shall find 2 s. ⅔, which ⅓ 2 d. ⅔: then for because that the Merchant of Worsteds loseth after 10 l. in the 100 l. for 100 he maketh but 90, and therefore say, if 100 giue but 90, how much shall 2 s. giue? multiply and diuide, and you shall find 2 s. and so much cost the pound of Musk in ready money.

Other Rules of Barter, wherein is given some part in ready-money.

When a Merchant ouer-selleth his Merchandize, and hee will haue also some part of his ouer-price in ready mony: as the ⅓, the ½, or the ¼, &c. he must subtract the same part of mony from the just price, & also from the ouer-price of his Merchandize: and the two numbers that remain after the subtraction is made, shall be the two first numbers in the Rule of Three: and the just price of the second Merchant shall bee the third number: to know how

how many he shall over-sell the part of his merchandize.

Example.

8 Two Merchants will change their merchandize, the one with the other, the one of them hath fine Wool at 5 l. the 100 pound weight to sell for ready mony, and in barter he will sell it for 6 l. and yet he will have the $\frac{1}{3}$ in ready mony. The other hath cloath of 13 s. 4 d. the yard to sell for ready mony, I would know how he shall sell the same in barter? Ans. Take the $\frac{1}{3}$ of 6 l. which is the over-price of the 100 of Wool, and that is 2 l. the which you must abate from 5 l. which is the just price of the C of Wool, and also abate it from 6 l. which is the over-price, and there shall rest 3 l. and 4 l. for the two first numbers in the Rule of Three, then take 13 s. 4 d. which is the just price of the yard of cloath, for the third number. Then multiply and divide, and you shall find 17 s. 9 d. $\frac{1}{3}$ for so much shall the second sell his cloath in barter.

9 More, two Merchants will change their merchandize the one with the other, the one of them hath Wax of 3 l. 6 s. 8 d. the C. to sell for ready mony, and in barter he will sell the same for 4 l. 3 s. 4 d. & yet he

he will have the ½ in ready mony. And the other hath fine crimson Satten of 15 s. the yard, to sell in barter; I demand what it is worth in ready mony? Answ. Take the ½ of 4 l. 3 s. 4 d. which is 1 l. 0 s. 10 d. and abate it from 4 l. 3 s. 4 d. and also from 3 l. 0 s. 8 d. and there resteth 3 l. 2 s. 6 d. and 1 l. 5 s. 10 d. for the two first numbers in the Rule of Three. And 15 s. for the third number, which 15 s. is the ober-price of the yard of Satten. Then multiply and divide, and you shall finde 11 s. And so much did the yard of Satten cost in ready mony.

10 Two Merchants will change their merchandize the one with the other, the one of them hath Tin of 50 s. C weight, to sell for ready mony, and in barter he will sell it for 3 l. 6 s. 8 d. and he will gain after 10 l. upon the 100 l. & yet he will have also the one half in ready mony. The other hath Lead of 3 half-pence the pound to sell for ready mony. I demand how he will sell the pound of Lead in barter? Anſ. See first at 10 l. upon the 100 l. what the 3 l. will come unto, in saying by the Rule of Three, if 110 give 100, what will 3 ⅓ give? multiply and divide, and you shall finde that they will come to 3 l. ⅔, which is 13 s. 4 d. of the which the half which he demandeth

in

in ready mony, is 36 s. 8 d. the same being abated from 50 s. and also from 3 l. 13 s. 4 d. there will remain 13 s. 4 d. and 1 l. 16 s. 8 d. for the two first numbers in the Rule of Three, which you must put all into half-pence, and the foresaid three half-pence, shall be the third number, and then multiply and divide, and you shall find 4 d. ½, and for so much shall he sell the 1 l. of Lead in barter.

11 More, two Merchants will change their merchandize the one with the other: the one of them hath Steel of 16 s. 8 d. the 100 l. weight, to sell for ready mony, and in barter he will sell it for 25 shil. and yet he loseth after 10 li. in the 100 li. but he will have the ½ in ready mony: the other hath Iron of 6 s. 8 d. the C. to sell in barter. I demand what the hundred of Iron did cost in ready mony? Answer. Say, if 100 come but to 90, how much shall 25 s. come to? multiply and divide, & you shall finde 22 s. 6 d. of the which number take the ½, which is 11 s. 3 d. and substract it from 22 s. 6 d. and also from 16 s. 8 d, and there will remain 11 s. 3 d. and 5 s. 5 d. for the two first numbers in the Rule of Three, and 6 s. 8 d. which is the ober-price of a C. of Iron for the third number: then multiply

and

and divide 4, you shall find 3 s. 2 d. $\frac{14}{17}$: and so much did C. of Iron sell in ready money.

12 Now, two Merchants will change their merchandize the one with the other: the one of them hath Hates of 20 s. 10 d. the piece to sell for ready money, and in barter he will sell the piece for 25 s. and he will abate the $\frac{1}{5}$ in ready money. The other hath Caps of 35 s. the dozen, to sell for ready money, but he will gain after the rate of 10 l. upon the 100 l. I demand how he shall sell a dozen of Caps in barter? Answ. Say if 100 be worth 110, what shall 35 shil. be worth, which is the just price of the dozen of Caps? multiply and divide, and you shall find 38 shil. 6 d. then take $\frac{1}{5}$ of 25 s. which is 6 s. 3 d. and substract it from 20 s. 10 d. and also from 25 s. and there will remain 14 s. 7 d. and 18 s. 9 d. for the two first numbers in the Rule of Three, & 38 s. 6 d. which is the just price of his gain in the dozen of Caps for the third number: then multiply and divide, and you shall find 49 s. 6 d. and for so much he shall sell the dozen of Caps in barter.

Chap. XII.

Of Exchanging of Mony from one place to another.

First you must note, that at Antwerp they use to make their accounts by Deniers de gros, that is to say, by pence Flemmish, whereof 12 doe make a shil. Flemmish, and 20 shil. Flemmish doe make 1 l. de gros.

Example.

1 If I deliver in Flanders 500 l. Flemmish at 19 s. 6 d. de gros, that is to say, at 19 s. 6 d. Flemmish, to receive 20 s. at London; I demand how much I shall receive sterling at London for the said 500 l. Flemmish? Ans. Say, if 19 $\frac{1}{2}$ give $\frac{20}{1}$, what will $\frac{500}{1}$ give? multiply and divide, and you shall find 512 l. 16 s. 4 d. $\frac{12}{13}$ of a d. And to much sterling shall I receive in London for my 500 l. Flemmish.

2 If I deliver in London 375 l. sterling to receive in Antwerp 21 s. 9 d. de gros, that is to say, Flemmish, for every sterling I demand how many pounds Flemmish I shall receive in Antwerp for the said 375 l. sterling? Answ. Say, if $\frac{12}{1}$ give 21 $\frac{3}{4}$ what will $\frac{375}{1}$, give? multiply and divide

e and you shall find 476 l. 16 shil. 3 d. many pounds Flemmish shall I receive Antwerp for the said 375 l. sterling in ntwerp.

3 If I take up money at Antwerp as- 19 s. 6 d. Flemmish, to pay for the same London 20 s. sterl. and when the day of yment is come, I am forced to returne same, and to take up money again in ndon to pay my Bill of Exchange, so t for 20 s. which I take up here I must 19 s. 6 d. at Antwerp, I demand whe- I doe win or lose, and how much in, or n the 100 l. of money. Ans. Say, if 19 ibe 19 $\frac{1}{2}$, what will $\frac{100}{1}$ gibe? multiply o ide, and you shall finde 98 $\frac{58}{79}$, the which ng abated from 100, there will remain $\frac{58}{79}$. And so much do I lose upon the 100 l. money.

4 If I take up at London 20 s. sterling, ay at Antwerp, 21 s. 8 d. Flemmish; when the day of payment is come, my ctor is constrained to take up money a- in at Antwerp, wherewith to pay the said sum: and there he doth receive 22 l. Flemmish, for the which I must pay s. at London. Now I demand whether doe win or lose, and how much upon the 00 l. of money after the rate? Ans. Say, if

21 2/3 gibe 23/1, what will 120/1 gibe? multi
and deuide, and you shall finde 101 7/11, f
the which abate 100, and there will rem
1 7/11, and so much shall I gain upon t
100 l. of money.

The Exchange from London i
France, is not like as it is in Flande
but is delibered by the French Crow
which is worth 50 Souse Tournois t
piece.

And here must you note, that in Franc
they make their account by deniers Tur
nois, whereof 12 Deniers maketh 1 Sou
Tournois, & 20 Souse Tournois make
1 l. Tournois, which they call a Libr
Franc, and the French Crown is cu
rent among Merchants for 51 Sou
Tournois, but by exchange it is otherwis
for they will deliber but 50 Souse Tur
nois, which is 2 l. 10 Souse Tournois f
a Crown, and at such price the Crown,
the Taker up of money can agree with t
Deliberer.

Example.

5 If I deliber 340 l. ster, here in Lo
don, after 6 s. 4 d. sterling the Crown, t
receibe at Roan, or at Paris 50 Sou
Tournois for ebery Crown. I wou
know how many Libres Tournois I sh
rec

ribe there for my 340 l. sterling? Ans. if 6 shil. $\frac{1}{1}$ sterling do give me 2 l. Tournois, what will $680\frac{0}{1}$ s. give? (which is 340 l. reduced into shillings.) Then multiply and divide, and you shall finde 114 Liures $\frac{4}{19}$ which is worth 4 sous $\frac{8}{19}$ Tournois, and so much shall I receive in Town or Paris for my 340 l. sterling.

6 If I deliver in Paris or Roan, or elsewhere in France, 1250 Liures Tournois, at 50 sous Tournois the Crown, receive for every such Crown 6 s. 3 d. sterling in London, I demand how much sterling mony I shall receive at London for my 1250 pound Tournois? Answer. if 2 l. $\frac{1}{3}$, do give me 6 s. $\frac{1}{4}$, what will it give? multiply and divide, and you shall finde 3125 s. sterling, which maketh 156 l. 5 s. sterling. And so many pounds I receive at London for the said 1250 Liures Tournois, after 6 s. 3 d. for every 50 sous.

CHAP.

Of the Rule of Alligation or Mixture.

The Rule of Alligation is so nam[ed] for that it teacheth to alligate or bi[nd] together divers parcels of sundry pri[ces] and to know how much you shall take of [each] very parcel, according to the numbers [in] the question, the which Rule is divided [into] two parts as followeth.

The first part of the Rule of Alligation sheweth how to make a mixture of divers things being of sundry prices: And of the same thing so mixed to know the common price of the said mixture.

Example.

1. A Man would mix 5 Bushels of wh[eat] at 2s. 8 d. the bushel, with 9 bushels of [rye] at 2 shil. the bushel, and would know how much the bushel so mixed doth stand in, the one with the other? Answ. For to know the same common price, you must multiply every thing by his price, and add all the products together: the which you must divide by the number of all the things that are to be mixed, and the quotient will

swer to the question, as in the aforesaid example, I multiply 5 bushels by his price, that is to say, by 2 s. 8 d. and thereof cometh 13 s. 4 d. Likewise I multiply 9 bushels by 2 s. maketh 18 s. both these sums added together, do make 31 s. 4 d. the which I reduce into pence: and they make 376 pence. Then I divide 376 by 14, which is the number of all the bushels, and my content will be 26 pence and $\frac{6}{7}$, and so much doth one Bushel of both the sorts of grain stand him in.

2. If you have two several things, whereof you would mix equal portions together, you must adde their prices, and take only the $\frac{1}{2}$: if you would mix together equal portions of three things, you must take $\frac{1}{3}$, and of four, the $\frac{1}{4}$: & so continuing, by Example. Wheat at 2 s. 8 d. the bushel, and Rie of 2 s. the bushel, being mixed by equal proportions, I adde 2 s. 8 d. and 2 s. together, and they make 4 s. 8 d. whereof the one $\frac{1}{2}$ is 2 s. 4 d, & so much is the value of 1 bushel of such a mixture. And if there were a portion of Barly at 20 d. then I must add 2 s. 8 d. 2 s. & 20 d. together, and they make 6 s. 4 d. whereof the $\frac{1}{3}$ which is 1 s. 1 d. $\frac{1}{3}$ should be the price of 1 bushel of that mixture.

3 A Merchant hath 27 l. weight large Clobes at 6 s. the l. 15 l. of the mid ſort at 2 s. 6 d. the l. And 10 l. of Full 2 s. 2 d. the l. when all that ſame are mix together, I would know how much the is worth? Anſwer. You muſt multiply ev ry drug by his price, and then divide t total ſumme of the products, by the whol weight of the drugs, and you ſhall fin 4 ſhil. 3 d. $\frac{1}{52}$, and ſo much is the pound that mixture worth.

27	at 6 s.	0 d.	162	
15	at 2 s.	6 d.	37	$\frac{1}{2}$
10	at 2 s.	2 d.	21	$\frac{2}{3}$
52			221	$\frac{1}{6}$

4 And if you would mix $\frac{1}{2}$ large Clobes $\frac{1}{3}$ of middle, and $\frac{1}{4}$ of Full, and you would know how much the pound weight wer worth, you muſt take a number which con taineth thoſe parts, as for example 12 whereof the $\frac{1}{2}$ which is 6, ſhall ſignifie many l. of large Clobes: The $\frac{1}{3}$ which is 4 ſhall be ſo many l. of the middle, and which is 3, ſhall be ſo many l. of Full Then afterwards you muſt multiply eve drug by his price, and divide the total ſu of all the products, by the whole ſum

the

drugs, and you shall find 4 s. $\frac{1}{26}$. And so much is 1 pound weight of the mixture.

6. at 6 s. 0 d.	36	
4. at 2 s. 6 d.	10	
3. at 2 s. 2 d.	06 $\frac{1}{2}$	
13	52 $\frac{1}{2}$	

And if you would make 100 l. weight of such a mixture, you shall work by the Rule of Company, and you shall find 46 l. of large Clothes, 30 l. $\frac{10}{13}$ of middle, and 23 $\frac{1}{13}$ of Fust.

6	13	100	6? Anſ. 46 $\frac{1}{13}$
4			4? Anſ. 30 $\frac{10}{13}$
3			3? Anſ. 23 $\frac{3}{13}$
13		100	

A Gold-smith hath 6 l. weight of fine bullion of 7 ounces fine, more 15 l. of 8 ounces $\frac{1}{2}$ fine, and 13 l. weight of 10 ounces fine, and he will melt all these together, and make of them one masse. The question is to know of what fineneſſe the pound weight is? Anſw. You must multiply the number of the weights of every bullion by his fineneſſe, and thereof will come the ounces and parts of ounces fine, which you must adde together, and they

will make 313 ounces $\frac{1}{3}$ of fine, the same you must dibide by 36 which is the whole sum of the pound weight of Bullion, and you shall find 8 ounces and $\frac{52}{72}$ remaining which $\frac{52}{72}$ parts of an ounce is worth 14 peny weight and 4 grains, and so much is the pound weight of this mixture worth.

8 Lib.	at 7 ounc. is	56
15	at 8 ounc. $\frac{1}{2}$ is	127 $\frac{1}{2}$
13	at 10 ounc. is	130
36		313 $\frac{1}{3}$

7 A Goldsmith hath 3 sorts of Silber Bullion, that is to say, 5 l. 7 ounces 10 peny weight, at 7 ounces $\frac{1}{2}$ fine; 12 l. 3 ounces, at 6 ounc. $\frac{1}{3}$ fine. And 4 l. at 9 ounces fine. All the which hee will melt into one masse. The question is, to know of what finenesse the l. weight of that mixture shall be? Answ. You must multiply every Bullion by his finenesse, as afore. And adde together all the products, & they doe amount to 155 l. $\frac{37}{48}$. Then add all the weights of the Bullions together into one sum, and they make 21 l. $\frac{7}{8}$, dibide then 155 l. $\frac{37}{48}$ by $\frac{7}{8}$, and your quotient will be 7 ounces & $\frac{10}{84}$ remaining, the which $\frac{10}{84}$ being brought into peny weights and grains, doe make 2 peny weight, 10 grains $\frac{2}{35}$ of a grain fine

So you may perceiue that the same
ture is of 7 ounces, 2 d. 10 grains, and
of a grain fine the pound weight.

And here is to be noted, that the reckening of the weight of Siluer is thus as followeth, that is to say,

1 Pound of Troy weight, maketh 12 ounces.

1 Ounce is diuided into 20 peny weight.

1 Peny weight is distributed into 24 grains.

1 Grain into 20 smaller parts, &c.

And the reckoning for Gold, is thus.

1 Ounce of fine Gold without any allay, is imagined to be 24 karets.

1 Karet is diuided into 4 graines.

1 Grain is parted into 2 half grains, or quarters of a grain, &c.

And so into other smaller parts.

But if the said Goldsmith would put 5 l. weight of Copper with the said Bullion, and you would know of what fineness it is, then you must adde the same 5 l. with the 21 l. $\frac{7}{8}$ and it maketh 26 $\frac{7}{8}$. Then diuide the aforesaid 157 $\frac{37}{48}$. by 26 l. $\frac{7}{8}$, and you shall find 5 ounces fine, and $\frac{83}{103}\frac{16}{20}$ remaining the which $\frac{83}{103}\frac{16}{20}$ is worth 15 peny weight, 12 grains and $\frac{6}{43}$. And of that fineness will the same masse be.

9 A Gold-smith hath melted 12 pound weight and 5 ounces of Gold Bullion, being of 18 Karets fine, with 4 l. weight 4 ounces and $\frac{1}{2}$ at 21 Karets fine; I demand of what fineneſſe is 1 l. weight of the ſame maſſe? Anſwer. You muſt multiply the weights (by the Karets fine) of each ſort, and adde the products together, the ſame you muſt divide by the whole ſum of all the weights added together, and your quotient will ſhew you of what fineneſſe the ſame is of, as in the former example, I doe multiply 12 l. and 5 ounces by 18 Karets, and thereof cometh 223 Karets $\frac{1}{2}$. Likewiſe I doe multiply 4 l. weight, 4 ounces $\frac{1}{2}$, by 21 Karets, and thereof cometh 91 Carets $\frac{1}{2}$, theſe two ſummes of Karets I doe adde together, and they make 315 Karets $\frac{1}{2}$. Then I doe adde 12 l. weight 5 ounces, and 4 l. weight 4 ounces and $\frac{1}{2}$ together, and they make 16. l. 9 ounces $\frac{1}{2}$, the which 9 ounces $\frac{1}{2}$ are $\frac{12}{24}$ parts of a pound: and therefore I divide 315 $\frac{1}{2}$ by 16 l. $\frac{12}{24}$ and thereof cometh 18 Karets, and $\frac{252}{3124}$ remaining, which fraction is 3 grains, and $\frac{12}{403}$ parts of a grain. And of that fineneſſe is 1 pound weight of the ſaid maſſe.

A Gold-ſmith hath melted 10 pound weight

weight, 7 ounces, and $\frac{1}{2}$ of 20 Karets, and fine. And 8 pound weight, 2 ounces and $\frac{2}{3}$ parts of 23 Karets fine, with 15 pound weight, 1 ounce of Silber. The question is what fineneſſe is the pound weight of the ſaid maſſe? Anſwer. You muſt multiply the weight of every ſort of Gold Bullion by his allay, that is to ſay, by his fineneſſe, and adde all the products together, and you ſhall find 405 $\frac{25}{96}$ Karets, then adde the weight of the two ſorts of Gold bullion, with the weight of the Silber together, and thereof will come 33 pound, 11 ounces $\frac{5}{24}$, the which 11 ounces $\frac{5}{24}$ is $\frac{269}{288}$ of a pound weight, then divide the ſaid 405 $\frac{25}{96}$ parts by 33 pounds $\frac{269}{288}$, and you ſhall find 20 Karets $\frac{4105}{363871}$. And of the ſame fineneſſe ſhall the pound weight of that maſſe of Gold be.

The Second part of the Rule of Alligation.

1 A Gold-ſmith hath 4 ſorts of Gold, the firſt is worth 30 Crowns the pound weight; the ſecond is worth 36 Crowns; and the third is worth 42 Crownes; and the fourth is worth 45 Crownes; and of theſe 4 ſorts he will make a Scepter of 6. l. weight, which ſhall bee worth 40 Crowns

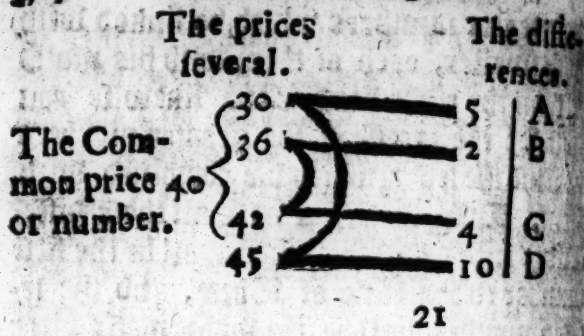
the

the Pound, I demand how much he must take of every sort? Answer, First you must set down the numbers whereof you will make the alligation (which are 30, 36, 42, and 45) orderly the one under the other, after the same manner, as if you would add them together: and the common number whereunto you will reduce them, you shall set on the left hand, which common number in this example is 40. Then mark which of the said four numbers are lesser than that common number, and which of them be greater, and with a draught of your pen, evermore link two numbers together, so that the one bee lesser than that common number, and the other greater than it, for two greater, nor two smaller numbers may not be linked together, for they will be either lesser, or else greater than the common number, but one greater number, and one smaller may be so mixed, that they will make the common number. And two greater or two smaller numbers, can never make the common number in due order, as hereafter shall appear.

After that you have thus linked them, then mark how much each of the lesser numbers is smaller than the common number, and that difference you shal set against

the greater numbers which be linked with those smaller, each of them with his match set on the right hand. And likewise you must set the excesse of the greater numbers against the lesser, which bee combined with them. Then shall you adde all those differences into one sum, which shall be the first number in the Rule of Three, and the second number shall be the whole massy piece that you will have of all the particulars, which in this example was presupposed to be a pound. Then the third sum shall be each difference by it selfe, and by them you shall find out the fourth number, declaring the just portion that you shall take of every particular in that mixture, as now by the former example, I will make it more plain.

The



21	6	5	||	21	6	2
21	6	4		21	6	10

Here in this former example, you see that I have set down the several prices, which be 30, 36, 42, 45, and have linked together 30, with 45, and 36, with 42, the common price 40. I have set on the left side, as before is declared, and the difference of it from every several price, I have set on the right hand, against that summe with the which it is linked. So the difference of 30, from 40, is 10, which I set against 45, that he is linked withall; and the difference of 45, above 40 is 5, which I have set against 30. So likewise, the difference of 42, above 40, is 2, that I have set against 36. And the difference between 36 and 40 (which is 4) I have set against

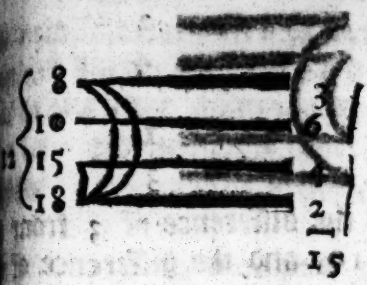
42

Then I adde all those differences together, namely 5,2,4, and 10, and they make 21, which I make the first number in the Rule of Three, and 6 pound which is the weight of the Scepter of Gold the second number, and the third number shall be every particular difference, for every several working. Then work by the Rule of Three: saying, if 21 (which is all the differences added together) do give me 6 pound weight, which is the weight of the Scepter, what shall 5 give, which is the first difference? I multiply and divide, and I find one pound weight $\frac{1}{7}$, so much must I have of the first price. Then I do in like manner with the rest, and I finde $\frac{4}{7}$ of a pound weight of the second price, 1 pound $\frac{1}{7}$ of the third price: and two $\frac{1}{7}$ of the fourth, the which 4 sums being added together, do make 6 li. which is the whole weight of the Scepter that I would have. And now to prove if the pieces do agree, you shall do thus: First multiply the total summe 6, by the common price 40, and it will make 240 Crowns, which you shall keep by it self. And afterward multiply every several summe of weight by the price belonging to the same weight, and if that summe do agree with

the

the first that you kept by it self, then is your work well done, as here 1 l. $\frac{5}{7}$ is the weight of the sort of Gold, which is of 30 crowns price. Therefore multiply 30 by 1 l. $\frac{5}{7}$. and it maketh 42 Crowns $\frac{6}{7}$ which you must set down. Then multiply $\frac{4}{7}$ (which is the weight of the second sort of Gold) by 36, which is the price of the same, and thereof cometh 20 Crowns $\frac{4}{7}$ so again 1 l. $\frac{1}{7}$. multiplied by 42 Crowns, which is the third price, doth make 48 Crowns. And last of all 2 l. $\frac{6}{7}$ multiplied by 45, maketh 128 Crowns $\frac{4}{7}$. All these being added together, doth make 240 crowns, agreeable to the former summe of 40, multiplied by 6. And thus I may affirm that this work is well done.

2 A Taverner hath 4 sorts of Wine of 4 several prices: the first of 8 d. the Gallon: the second of 10 d. the Gallon: the third of 15 d. and the fourth of 18 d. and he will mix all these sorts together, so that the Gallon shall be worth but 12 d. I demand how many Gallons he must take of every sort? Answ. First suppose the Puncheon to hold some certain measure, as to contain 84 Gallons, and then the form will be after this sort, as you see hereafter following.



If 15 do give 84.

What will 3 give?	they make	16 4/7	of the 1.
What will 6 give?		33 3/7	of the 2.
What will 4 give?		22 2/7	of the 3.
What will 2 give,		11 1/7	of the 4.
		84	

3 A Mint-master hath 4 sorts of silver Bullion of these fineness following. The 1st is [illegible] ounces fine, the second of 5 ounces fine: the third of 8 ounces fine: and the fourth of 10 ounces fine. And of all these sorts, he would make another sort, that should be but of 6 ounces fine. The question is, to know what portion he must take of every of the said Bullions? Answer, set down the particular fineness, the one under the other, namely, 3, 5, 8, & 10, and 6, which is the common fineness, before them toward your left hand, as here you may see.

6

Then put the difference of 3 from 6 right against 10, and the difference of 6 from 10, which is 4 right against 3. Likewise the difference of 5 from 6 which is 1, right against 8, & the difference of 6 from 8, which is 2, right against 5. This done, you shall conclude, that for every 4 pound weight that he taketh of the Bullion of 3 ounces fine, he must take 2 pound of the Bullion of 5 ounces fine, and 1 l. weight of the Bullion of 8 ounces fine, and 3 l. weight of that which is of 10 ounces fine. Or else if you please, adde 4, 2, 1, and 3 together, and they make 10, which shall be the denominator of every of the portions. that is to say, you shall take $\frac{4}{10}$ of the Bullion of 3 ounces fine, $\frac{2}{10}$ of that which is of 5 ounces fine, $\frac{1}{10}$ of that of 8 ounces fine, & $\frac{3}{10}$ of that which is of 10 ounces fine. And so of all such like. And if you would make 60 pound weight of such a mixture, you must adde 4, 2, 1, & 3 together, which maketh 10, & then work by the Rule of Company, saying, If 10 l. give 60 l. what will 4 give?

likewise, what will 2 give, &c? This form may be varied, by combining the particular values after this manner, as here you see, and as in the other example, it is plain.

Sometimes the value doth change the difference, and is linked unto divers, to represent the portion that is to be taken of every thing, as by example. A Merchant hath Wheat of 2 s. 8 d. the bushel, Rye of 2 s. and Barley of 16 d. the bushel, and he will make a mixture of these sorts which shall stand him but in 22 d. the bushel. It is demanded how much he may take of every sort of the said grain? Answ. Put the difference of 22 from 32 and 24 right against the 16. And likewise the difference of 16 from 22 right against 32 and against 24. And you shall find for 6 bushels that he take of Wheat, he must take 6 bushels of Rye, and 12 bushels of Barley.

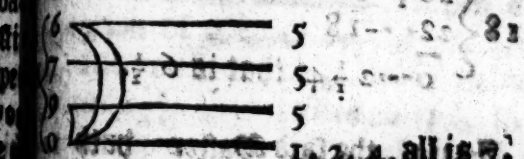
d.

22 { 32 --- 6
24 --- 6
16 --- 10, & 2 of 12.

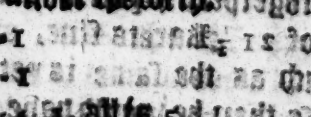
5 A Mint-master hath Bullion of 9 ounces 10 peny ~~weight fine~~, and of the same he would make mony, which should be but of 6 ounces fine, and therefore it behoves him to melt copper therewith, which is valued at 0 peny ~~weight of fine~~. The question is, to know how much silver and copper he must mix together? Ans. After that you have put down 9 ounc. $\frac{1}{2}$ for the value of the silver, and right under the same 0 for the copper, you must take the difference of 6 from 9 $\frac{1}{2}$ which is 3 $\frac{1}{2}$, and place the same sum right against the 0, for to signifie the portion of copper that he must take: And the difference of 0 from 6 is 6: the same you must set right against 9 $\frac{1}{2}$, which shall represent the portion of silver that he must take. And thus you see that for 6 pound of silver that he taketh, he must take 3 pound $\frac{1}{2}$ copper to make the said mony of 6 ounces fine.

6 { 9 $\frac{1}{2}$ } 6 l. sil.
0 } 3 l. $\frac{1}{2}$ copper

And if he had 3 sorts of Silver Bullion, that is to say, of 6 ounces fine, of 7 ounces fine, and of 9 ounces fine, and he would make mony thereof, which should be but of 5 ounces fine, it behobeth him to mix copper therewith. And this form following doth shew how the same must be combined, and likewise how much he must take of every sort.



Likewise a Mint-master hath Bullion of Gold, at 19 Karets fine, some at 22 Karets fine, some at 24 Karets, which is all fine without corruption, and he will make coyn thereof which shall be 23 Karets fine, it is demanded how much he must take of every sort? Ans. Make your Alligation in this form here under sheweth.



Wore, the said Master hath Gold of 20 Karets ½ fine, and of 22 Karets fine, and he will allay the same to 18 Karets fine. And

for to do the same, it is convenient for him to mix Silber therewith, which is esteemed at 0 Karets fine, but proceeding according to this Rule, he shall find that for 18 l. weight, or other portions that he taketh of the 2 sorts of Bullion of Gold, he must take 6 pound weight, and $\frac{1}{2}$ of Silber, to allay the same unto 18 Karets fine.

$$18\left\{\begin{array}{l} 20\frac{1}{2}\text{--}18 \\ 22\text{--}\text{--}18 \\ \hline 0\text{--}2\frac{1}{2}\ 4\text{: that is } 6\frac{1}{2}. \end{array}\right.$$

7 Again, the said Master hath 100 l. weight of Gold at 22 Karets fine, and 20 pound weight at 19 Karets fine, the which he will allay to 20 Karets fine. The question is, whether he ought to mix any Silber with the same, yea, or no, and how much? Answer. You must consider (by the first part of the Rule of Alligation) the allay of the 100 l. and of the 20 l. being melted together, & you shall find that the same is of 21 $\frac{1}{2}$ Karets fine, and therefore for much as the same is yet of a better fineness than he would have it, he must therefore mix Silber therewith, that is to say for 20 l. weight or portions of Gold he must take thereto 1 l. $\frac{1}{2}$ of Silber.

8 If he had 1 l. weight fine Silver of 20 ounces fine, I demand how much Copper he must mix with the same, to allay unto 11 ounces $\frac{1}{4}$ fine, that is to say, to 11 ounces 5 d, weight fine? Make your Alligation as before is taught. Then divide the portion of Copper by the portion of fine, and you shall find $\frac{3}{17}$, which being abbreviated is $\frac{1}{17}$. And thus to every l. weight of Silver, you must take $\frac{1}{17}$ of a l. of Copper, and for every 11 pound $\frac{1}{4}$ of Silver, you must take $\frac{1}{4}$ of a l. of Copper. And so is to be done with the same, in case that it were of any other allay.

9 A Master hath 1 l. of fine Gold of 24 Karets fine, the which he would allay to 22 Karets fine. The question is, to know how much Silver must be mixed with the same, that it may be of the fineness of 22 Karets before? Answ. Take the difference of 22 to 24, which is 2, then divide 2 by 22, which you cannot, for they are $\frac{2}{22}$, but abbreviate them, and it is $\frac{1}{11}$. And so much fine Silver must be mixed with 1 l. weight of fine Gold, that the same may be of 22 Karets fine.

10 A Gold-smith hath 1 l. weight of Silver Bullion of 7 ounces fine, it is demanded how much fine Silver he must put to the same, that being molten together, it may be of 10 ounces fine? Ans. make your Alligation of 7, and 12 unto 10. and then divide the portion of the fine silver, by the portion of Silver Bullion, and you shall find 1 ½; and thus to 1 l. weight of 7 ounces fine, you must take 1 l. ½ of fine silver of 12 ounces fine, to make the same of 10 ounces fine.

11 A Merchant hath given order unto his Factor to imploy him 83 l. 6. 8 d. ster. in 5 sorts of spices, that is to say, in Nutmegs of 80 pence the pound, Cloves at 76 pence the pound, Cinamon at 52 pence the pound, Ginger at 34 pence the pound, and Pepper at 30 pence the pound. But he hath not appointed him the quantity or portion which he should buy of every sort, neither yet of all the sorts together. The question is, to know how much the Factor must buy of every sort, to have of each the like quantity. Answ. You must adde 80, 76, 52, 34 and 30 together, and they make 272. Then must you divide 83 l. 6 shil. 8 d. being reduced into pence, namely 20000 pence by 272, and thereof come

73 l. 9/17 and so many pounds must be buy every sort of the said prices.

12 But in case he would not have so many pounds of the one sort, as he would have of the other, then you must take another middle value between the said particulars: As for example, let the mean number be 50 pence, then reduce the said 7 l. 6 shil. 8 d. into pence, as the other prices are, and they do make 2000 pence, the same you must divide by 50 pence, which is the mean or common price, and there of will come 40 pounds. And so many pounds must he have of all the sorts together. Then if you will know how many pounds he must have of every sort, you must set down your particular prices under the middle value, that is to say, after the pence, as hereafter followeth: And then work by the Rule of Company, and you shall find how much he shall buy of every sort.

110

110 give 400, what { 30? Anſ. 72 2/11 / 16? Anſ. 58 3/11 / 16? Anſ. 58 3/11 / 28? Anſ. 101 5/11 / 30? Anſ. 109 1/11 }

400

CHAP. XIV.

Of the Rule of falſhood, or falſe Poſitions.

THe Rule of Falſhood is ſo named not for that it teacheth any deceit or falſhood, but that by feigned numbers taken at all adventures it teacheth to find out the true number that is demanded. And this (of all the vulgar rules which are in practice) is the moſt excellent: This rule hath two parts, the one is of one falſe poſition alone; the other is of two poſitions, as hereafter ſhall appear.

Those questions which are done by false positions, have their operations in a manner like unto that of the Rule of Three; but onely that in the Rule of Three, we have three numbers known, and here in this Rule we have but 1 number that cometh in use to work by: unto the likeness whereof, we must devise two other numbers, the one multiplying, and the other dividing as by example.

1 I have delivered to a banker, a certain summe of pounds in mony, to have of him by the year simply 6 l. upon the 100 l. And at the end of 10 years, he paid me 500 pound for all, both principal and gain. I demand how much was the principal summe that I delivered him at the first? Here you see that there are divers terms, but the chief to work withall is 500 l. which cometh of the other numbers, that is to say, of 10 and 100, for of them is compounded or made the tenor of the question, the practice whereof is thus:

Let us feign a number at pleasure, and with the same let us make our discourse, then as though it were the principal sum that we seek for. As by example. Suppose that I delivered him at the first 200 l. the which were worth to me in tenne

years

years 120 l. after the rate of 6 l. upon the 100 l. Then 120 l. added with 200 l. do make but 320 l. and I must have 500 l. Thus you see that I have three terms of the Rule of Three: the one which shall contain the Question, the other two which I have formed artificially, which are 200, 320, in such sort, that 320 ought to have such proportion to 200, as 500 hath unto the number that I seek, that is to say, unto the true principal summe, then must I have recourse unto the Rule of Three, after this sort, saying: If 320 l. become of 200 l. of how much shall come 500 l. I do multiply 500 by 200, and they are 10000 the which I must divide by 320 l. and thereof commeth 312 l. $\frac{1}{2}$. which is the sum that I delivered at the first. And thus this Rule hath some congruence with the double Rule of Three.

2 I have a Cistern with three unequal cocks, containing 60 pipes of water: And if the greatest cock be opened, that water will void clean in one hour, at the second it will avoid in two hours, and at the third it will require three hours: Now I demand in what space it will avoid, all the cocks being set open? Answ. Suppose that it will avoid in half an hour: that is

to say, in 30 minutes. Then must there void at the first cock the $\frac{1}{2}$, which is 30 pipes: and by the second cock the $\frac{1}{4}$, which is 15 pipes, and by the third cock the $\frac{1}{6}$, that is 10 pipes, all the which summes being added together, do make 55 pipes: but it should be 60 pipes: Therefore say by the rule of Three, if 55 pipes do void in 30 minuts, in how many minuts will 60 pipes void? Multiply and divide, and you shall find 32 minutes $\frac{4}{11}$, the which $\frac{4}{11}$ being reduced $\frac{8}{11}$ of a minute, and in that space will the water void, if all the cocks be set open.

Of the Rule of two false Positions.

The summe of this Rule of two false Positions is thus, when any Question is proposed appertaining to this Rule, first you must imagine any number at your pleasure, which you shall name the first position, and with the same you shall work instead of the true number, as the question doth import: and if you see that you have missed of the true number that you do seek, then is the last number of the work, either too great or too little, the which number, you shall note with the sign of more or less, for that is the first error, in the which

you

you have failed, the which signs of more and less, shall be noted with these figures. X —, This figure X betokeneth more: and this plain line--, signifieth lesse: that is to say, the one signifieth too much, and the other too little: then you must begin again, and take another number, which shall be the second position, and worke by the question as before: if you have failed again, note the excesse or want, for that is the second error. Then shall you multiply the first position by the second error cross-wise, and again the second position by the first error (and this must always be observed) and you must keep the two products: then if the signs be both alike, that is to say, either both too much, or both too little, you shall abate the lesser product from the greater, and likewise you shall subtract the lesser error from the greater, and by the remain of those errors, you shall divide the residue of the products, the quotient shall be the true number that you seek. But if the 2 signs be unlike, that is to say, the one too much, & the other too little, then you shall adde those products together, and likewise you must adde both the errors together, and by the summe of those errors, divide the total sum of both the products: the quotient

shall

shall be the true number that you do seek, and this is the whole Rule, as by these examples following, it will appear more plain.

Example.

A Man lying at the point of death said: that he had in a certain Coffer 100 Duckets, the which he bequeathed to 3 of his friends by him named, after this sort: The first must have a certain portion: The second must have twice so many as the first, putting 8 Duckets: And the third must have three times so many as the first, less 15 Duckets. Now I demand how many every of them must have? Answer. First I do imagine that the first man had 30 Duckets, then by the order of the question, the second should have 52, and the third 75. These three summes being added together do make 157 and I should have but 100, so that this first error is too much by 57 then I put apart the first position 30 with his error 57 too much, after this sort 30 X 57. Therefore I prosecute my work, & I suppose that the first had 24, then by the order of the question, the second should have 40, and the third 57, these three summes being added together, do make 121, & I must have but 100, so the second error is too much

by

by 21. Therefore I note 24 X 21, under the 30 X 57, which was my first position with the error, as you may see in the Example following.

Then I multiply cross-wise, 30, (which is the first position) by 21 which is the second error, and thereof commeth 630. Likewise I multiply 24. (which is the second position) by 57, which is the first error, and I find 1368: Then because the signs of the errors are both like, that is to say, both too much, I must therefore substract 630 from 1368 and there wil remain 738 which is the dividend.

630

30 X 57

X

24 X 21

1368 36

630

738

11

738

366 (20½

3

20½

33

46½

100

Again, I must substract the lesser error from the greater, that is to say, 21 out of 57, and there will remain 36, which shall be my divisor. This done, I divide 738 by 36, and the quotient will be 20½.

The

The which 20 $\frac{1}{2}$ is the just number of the Duckets that the first man had for his part, so consequently the second man had 13 Duckets, and the third 46 $\frac{1}{2}$, as by the working before may appear.

The like number will also appear in case the errors were both too little, as in making the two positions 28 and 20, & you shall finde that the two errors will be both too little, the first will be too little by 15, and ẏ second too little by 3, as by perusing this work, you shall well perceibe.

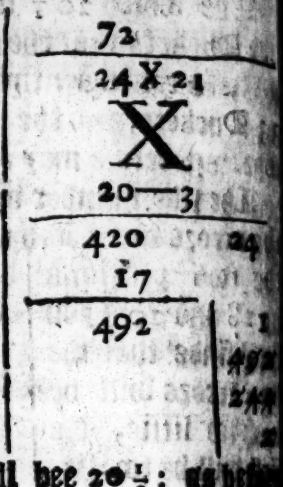
54
28--15
X
20--3
300. 12
54.
240. | 246 (20 $\frac{1}{2}$
122
1

Again, if one of the errors were too much, and the other too little, yet you shall take the true number as before. As if the two positions were 24 and 20, you shall finde that the first error will be 21 too much, and the second will be 3 too little. Therefore multiply 24 by 3 cross-wise, cometh 72.

Likewise multiply 20 by 21, the product will be 420. These two summes 72 and

420

420, you shall adde together, for because the signs of the errors be unlike, and they make 492, the which shall bee your dividend, and again, add the lesser errors, with the greater error 21, & they make 24 for your divisor, then divide 492 by 24, the quotient will bee $20\frac{1}{2}$: as by doth plainly appear.



And now because you shall not forget this part of the Rule, learn this briefe remembrance following.

The signs both like, Subtraction doth require; and unlike signs, Addition will serve.

The meaning whereof is thus, if both the errours have like signs, then must the Dividend and the Divisor be made by subtraction, as is taught before, and if the signs be unlike, then must you by Addition gather the Dividend, and the Divisor, as I have done in this last example.

Another

Another Example.

A man hath two silver Cups of unequal weight, having to them both but one cover, the weight whereof is 5 ounces, if the cover be put to the lesser Cup, it will be in double proportion unto the weight of the greater, and the cover being put to the greater Cup it will be in triple proportion unto the weight of the lesser, I demand what was the weight of every Cup? Answ. Suppose that the lesser Cup did weigh 7 ounces, then with the cover it must weigh 12 ounces, and this weight should be in double proportion unto the greater, therefore the greatest will weigh but 6 ounc. adde unto it 5 ounc. for the cover, all will be 11 ounc. but it should be 11, for to have a triple proportion unto 7, which doth represent the weight of the lesser Cup: So that this first error is two little by 10, which you shall note after 7 in the first, 7, ——— 10.

105	
7 — 10	
X	
9 — 15	
90	5
105	
90	15 (3 ounc.
15	5

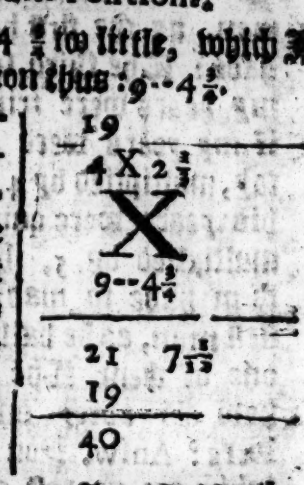
After you shall suppose some other number as 9, and make the like work as before, so you shall find 15 too little for the second error, which you shall put behind with the sign less, thus - 15, and then work with the rest as above is said, and you shall find that the lesser Cup weighs three ounces, and consequently the greater four ounces.

5. One man demanded of another in a morning what a clock it was? The other made him this answer, if you do adde (said he) the $\frac{1}{4}$ of the hours which be past since mid-night, with the $\frac{2}{3}$ of the hours which are to come until noon, you shall have the just hour, that is to say, you shall know what a clock it was? Answ. Suppose that it was 4 a clock in the morning, so should there remain 8 until noon, then I take the $\frac{1}{4}$ of 4 which is 1, and the $\frac{2}{3}$ of 8 which is $5\frac{1}{3}$ and I adde them together, so I find $6\frac{1}{3}$ & I supposed but 4, therefore this first error is too much by $2\frac{1}{3}$, which I note after my position, thus $4 \times 2\frac{1}{3}$: then again I suppose another number, that is to say 9, so should remain but 3 hours until noon, I take the $\frac{1}{4}$ of 9, and the $\frac{2}{3}$ of 3, which is $\frac{1}{4}$ and 2: these I adde together & they make $4\frac{1}{4}$: but I supposed that it was 9, therefore

the second error is $4\frac{3}{4}$ too little, which I note behind my position thus: $9 - 4\frac{3}{4}$.

And then I multiply cross-wise, as before is taught, and because the signs of the errors are unlike, that is so say, the one too much, and the other too little, therefore in this work, I must add the products, and they will be 40. Likewise I must adde the errors, and they be $7\frac{1}{12}$. Then I divide 40 by $7\frac{1}{12}$, and thereof commeth 5 hours $\frac{11}{17}$, and that hour it was in the morning.

$$\begin{array}{l} 19 \\ \hline 4 \times 2\frac{1}{3} \\ \quad \times \\ 9 - 4\frac{3}{4} \\ \hline 21 \quad 7\frac{1}{12} \\ 19 \\ \hline 40 \end{array}$$



CHAP. 15.

Divers Questions extraordinary, every one of them containing a general Rule for such like examples.

Five men devising of their ages: the first said to the others, that he was 120 years of age: the 2d said, if my years were doubled, then should I be so many years more than the first

man, as the first hath now more than
have: The third said in like manner,
my years were tripled, The fourth sa
if my years were quadrupled, that is
say, multiplied by 4: The fift said, that
his years were quintupled, that is to s
multiplied by 5, that they should each
them have so many years more than
first man, as he hath now more than eit
one of them. The Question is to kno
how old every one of the other 4 m
were? Answ. You must take the numbe
which are nearest collaterals, in natur
order unto 2, 3, 4, and 5, by reason of d
pling, tripling, &c. And the greater of eit
of the said numbers collaterals, must b
your Denominator to the lesser numb
As thus, the next collateral numbers u
to 2, are 1, and 3, which is $\frac{1}{3}$. Like
the next collateral numbers to 3 are 2 a
4, which is $\frac{2}{4}$. And so for 4, are 3 and
which are $\frac{3}{7}$, and for 5 are 4, and 6, w
be $\frac{4}{6}$. Then if you would know the seco
mans age, you must adde unto 120 t
of it self, which is 40, all is 160, the
you must divide by 2, and thereof co
80 years, and so old was the second m
And for to know the age of the third
you must adde unto 120 his own $\frac{2}{3}$ th

tay, his $\frac{1}{3}$ which is 60, and they make 180. The said summe you must divide by and thereof commeth 60 years for the ird mans age. And after the same man- r, you shall find that the fourth man 48 years, and the fifth had 40 years. he proof is very easie.

2 A man having his eye-sight somwhat ered, began to tell and reckon a certain mber of Birds to be in all 18. His Com- ion that had a clearer sight, beholding ll the Birds: answered him that there not 18. But said he, if there were so many more as there are, there ld be as many more above 18, as there now lesse than 18. The question is, to w how many birds there were in all? f. You must adde unto 18 his $\frac{1}{2}$, that is , his $\frac{1}{3}$ thereof will come 27, which hall divide by 3, and thereof commeth nd so many Birds there were in all.

3 A Draper hath bought 24 sorting ths and he hath sold 100 pounds worth the same cloaths, upon the which he gained as much as one cloath did cost I demand what one of the said ths did cost him? Answ. You must 1 unto 24, and they make 25. Then de 100 by 25, and thereof will come

4 li, and so much did one cloath cost him.

4 A Maid carried Eggs unto the mar-
ket, and it happened a merry Fellow to
meet her, who began to jest with her in
such sort, that he overthrew her basket
and brake all her Eggs. The Maid be-
much displeased with him for breaking
the same, said very earnestly unto him, th
he should pay for them: the Man consider-
ing with himself, that by his folly the
were broken, answered the Maid that h
would pay her for them and therefore be de-
manded of her what number she had. Th
silly poor wench that could not well reckon
said unto him, that she could not well tel
him, but said she: when I did put them in
to my Basket by 2 and by 2, there re-
mained 1 Egg: and when I counted them
by 3 and by 3, there remained 1: and when
I did reckon them by 4 and by 4 there re-
mained still 1: but when I did count them
by 5 and by 5, there remained none. The
question is to know how many Eggs th
Maid had in all? Answ. For to do thi
and all such like questions, you must multi-
ply 2, 3, and 4 together, saying: 2 times
maketh 6, and 6 times 4 make 24, unto th
number you must adde 1, they make 25
And so many Eggs she had in all. But t

had had a greater number of Eggs that she might have counted them till she came to 7 & 7, after the same manner as she did, till she came to 5 and 5, you must multiply the numbers, 2, 3, 4, 5, and 6, the one by the other, and thereof will come 720, unto which adde 1, and they make 721. And so many Eggs she should have had, if she had counted them by 7 and 7.

5 Again, if she had said, that when she counted her Eggs by 2, and by 2 there remained 1, and by 3 and 3, there remained 1, and by 4 and 4, there remaineth 3, and by 5 and 5, there remained nothing. The question is, to know how many Egges she should have had? Answ. You must finde a number the least that you can possible, which may be divided by 2, by 3, and by 4, that is to say, 12 is the nearest number; divide the same by 5, and there remaineth 2. This being done, you must find two numbers, the least that is possible, which may be divided by 5, and by 7, in such sort, that the number which is divided by 2, (may exceed the other that is divided by 5) onely by 1, and those two numbers are 10, and 6, for if you divide 6 by 2, your quotient will be 3, and 10 divided by 5, bringeth but 2:

then consider, that 6 containeth 3 times 2, and therefore you must multiply 12 by 3, and they make 36, from the which you must subtract 1, and there will remain 35, which is the number that is required to be found.

6 And if she had counted them after the same manner unto 7, and that there had remained nothing: then you know that 60 is the nearest number that may be divided by 2, 3, 4, 5, and 6, the which 60 being divided by 7, there will remain 4, & therefore you must find two numbers the least that may be, that can be divided by 4 & by 7, in such sort, that that number which is divided by 4, may exceed the other number (by 1) that is divided by 7, the which 2 numbers are 7, & 8, for if you divide 8 by 4, your quotient will be 2. And dividing 7 by 7, your quotient will be 1, and therefore for because that containeth two times 4, you must multiply 60 by 2, & thereof commeth 120, from the which number you shall subtract 1, and the residue which are 119, is the number that is required.

7 A Theef entring into a Garden, did steal from thence a certain number of Apples: And at his comming forth, he did meet with three men, one after another,

, who threatned to accuse him: and to appease them, he gave unto the first of all his Apples. who received the with thanks, but he returned him 12 them back again. Then he gave unto e second the $\frac{1}{3}$ of them that he had remaing, who received the same, but he gave back again 7 Apples: & so he gave unto third man, the $\frac{1}{3}$ of the residue, who urned him 4 And in the end he had still maining 20 Apples. The question is, to ow how many Apples he gathered in e said Garden? Answ. For to do this, u shall substract 4 from 20, and there will main 16, the same you shall double, and ey make 32, from the which you must ute 7, and there will remain 25: the me you shall double, and they make 50: om the which you shall substract 12, and ere will remain 38, whereof the double hich is 76, doth shew the number of Apes that he gathered. This and such like estions are easie to be done in going ckwards from the end of the question, ntill you come to the beginning thereof. ut if he had given the $\frac{1}{3}$ unto one of em, the $\frac{1}{4}$ unto another, and $\frac{1}{4}$ unto the d, or any other, all the same may be done the Converse Rule, that is to say,

beginning at the end of the Question, till you come to the beginning, as before is said.

8 A Merchant did ride unto three several Fairs: At the first he doubled his money and spent 10 Crowns: at the second Fair he did also double his money and spent 10 Crowns: And likewise at the third Fair, he did double his money and spent 10 Crowns, and in the end he found that he had remaining but 2 Crowns. The Question is, to know how many Crowns he had at the first? Answ. For to do this, you must adde unto 10 Crowns, the two Crowns which he had remaining, and they make 12, whereof you shall take the $\frac{1}{2}$ which is 6: again adde 6 unto 10, and they make 16: whereof you shall take the $\frac{1}{2}$ which is 8: Finally you shall adde 8 unto 10, and they make 18, whereof you must take the $\frac{1}{2}$ which is 9: and so he had 9 Crowns at the first.

9 A Burgess would distribute a certain summe of Pence unto divers poor men equally, but after that he had counted how many there were in number, he perceived that if he should give unto every man 6 d. he should want 14 d. But if he should give every man 5 d. the piece, he should have

9 d.

d. remaining. The question is, to know the number of the poor men. Answ. For to do this, and such like questions, you must have in remembrance this principal, more from more, or less from less, &c. which is set out in two Verses in the Rule of false positions, that is to say, you must adde the less with the more. Namely, 14 with 9, and they make 23: and divide the same sum by the difference which is of 5 from 6, that is 1: and therefore you must divide 23 by 1, but 1 doth neither multiply nor divide, therefore you may conclude, and say, that there were 23 poor men.

10 And if he should give to every man 7 pence, he should have 19 pence remaining, and giving every man 7 d. he should have 3 pence over: In this case you must abate more from more, that is to say, 3 from 19, and the rest which is 16, you must divide by 2 which is the difference of 5 from 7: and the quotient which is 8, doth shew you the number of the poor men, and likewise if ½ he had had both wants, that is, if both the numbers had been too little, you must have done with them as you did with the others that were both more.

11 A Man hath given unto 20 Work-folks 20 shillings, that is to say, unto men,

women, and boys: unto men he gave 20 d. a piece, unto women 15 d. and unto boys he gave 8 d. The question is, to know how many men, how many women, and how many boys there were in all? Answ. First you must take the difference of 8 from 15, and also from 20: and you shall have 7 for the difference of the women, and 12 for that of the men: this done, you may suppose that there were 20 boys, the which at 8 d. the piece, maketh 160: the which you must abate from 20 shil. being reduced into pence, that is, from 240 pence, and there will remain 80 pence, the which 80 you shall divide into 2 such parts that the one may be divided by 7, and the other by 12, and that nothing may remain after the divisions are made. The which two numbers are 56 and 24: For 56 being divided by 7 bringeth into the quotient 8, and 24 being divided by 12, will bring into the quotient 2: which sheweth that there was 8 women, 2 men, and the rest of the 20 which are 10 were boys, so there were 8 women, 2 men, and 10 boys. Some men do call this Rule, the Virgins Rule.

CHAP. 16.
Of Sports and Pastime, done by Number.

IF you would know that number that any man doth think, or imagine in his mind, as though you could Divine: Bid him triple the same number, then of the product let him take the $\frac{1}{2}$, if the number bee even, or else the greater half, if the same be odde, then bid him triple again the said $\frac{1}{2}$: after say to him, that he shall put away if he can 26, 27, or 9. from the last number being tripled: that is to say, cause him subtilly to put away 9, as many times as is possible, and keep the number secretly: and when he can no more take away 9: then to know if that yet there remain any number, bid him abate 3, 2, or 1 if he can: this done, see how many times 9 you have caused him to abate, for the which keep you in minde so many times 2, and if that you know that he had any thing remaining besides the nines, the same shall note unto you 1,

Example

Example.

Suppose that he thought 6, which being tripled is 18, whereof the $\frac{1}{2}$ is 9, the triple of that is 27: now cause him to abate 18, or 9, or 27, and again 9: but then he will say unto you that he cannot; bid him then abate 3, or 2, or 1, he will say also that he cannot; wherefore considering that you have made him to abate 3 times 9 justly, you shall tell him that he thought 6, for 3 times 2 maketh 6. If he had thought 5, the triple thereof is 15, whereof the greater $\frac{1}{2}$ is 8. the triple of that maketh 24, which containeth 2 times 9, they are worth 4, and the remain signifieth 1, the which added together make 5, which is the number that he thought.

2 If in any company, one of them hath a Ring upon his finger, & you would know by manner of divining who hath the same, and upon what finger and what joynt: cause the persons to sit down in order, and keep likewise an order of 3 fingers: then separate your self from them in some certain place, and say unto one of the Lookers on, that he double the number (marking well in your mind the order) of him that hath the Ring, and unto the double bid him adde 5, and then cause him to multiply

his addition by 5, and unto the product bid him adde the number of the finger of the person which hath the Ring: Suppose that the same last sum did amount to 89, then afterward say to him, that he put after the same last number toward his right hand, a figure signifying upon which of the joynts he hath the Ring, as if it be upon the third joynt, let him put 3 after 89, and it will be 893, this done, you shall ask him what number he keepeth, from the which you shall abate 250, & you shall have 3 figures remaining at the least. The first toward your left hand shall signifie the number of the person which hath the Ring. The second or middle figure shall represent the number of the finger. And the last figure toward your right hand, shall betoken the number of the joynt. As if the number which he did keep were 893, from that you shall abate 250 and there will remain 643 which do note unto you, that the fifth person hath the Ring upon the 4 finger, and upon the third joynt.

But note, that when you have made your subtraction, if there do remain a cipher in the place of Tens, that is to say, in the second place, you must then take 1 from that figure which is in the

place

place of hundreds, that is to say, from the figure which is next your left hand, and that shall bee worth 10 tenths, signifying the tenth finger: as if there should remain 703, you must say, that the first person (upon his tenth finger, and upon his third joynt) hath the King.

3 And after the same manner, if a man doe cast three Dice, you may know the points of every one of them, for if you doe cause him to double the points of one Dye, and unto the double to adde 5, and the same summe to multiply by 5 and unto the product adde the points of one of the other Dice, and behind that number toward the right hand, to put the figure which signifieth the points of the last Dye, and then shall you ask him what number he keepeth, from the which abate 250, and there will remain 3 figures: which doe note unto you the points of every Dye.

4 Likewise, if 3 of your Companions, to say, Peter, James, & John, would (in your absence) give themselves every one a contrary name: as for example: Peter would be called a King, James a Duke, and John a County: and you would Divine which of them is called a King, which the Duke, and which the County: take 24 stones, or pie-

pieces whatsoever, and give unto Peter 1, unto James 2, and unto John 3, or otherwise: But mark well unto which of them you have given 1, unto which 2, and unto whom 3. Then leaving the 18 stones (before them) that are remaining, you shall absent your self from their sight, or else turn your face from them, saying thus unto them: whosoever nameth himself a King, for every stone that I gave him, let him take 8 of the residue, and he that nameth himself a Duke, for every stone that I gave him, let him take 2 of them that remain; and he that calleth himself a County, for every stone that I gave him, let him take 4: this being done, approach near them, and mark how many stones are remaining: and know this, that there cannot remain any other number but one of the six, 1, 2, 3, 5, 6, 7, for the which six numbers, we have chosen to every of them a several name, which are these; Angeli, Beati, Talier, Messias, Israel, Pietas: each of them containing 3 vowels, a, e, i, which do shew the names in order: That is to say, the vowel a,

sheweth which is the King; the bowel e, telleth which is the Duke; and the bowel i, sheweth which is the County: in following the order how, and to whom you have given one stone, to whom 2, & to which 3, then if there do remain but 1 stone, the first name Angeli, (by these 3 bowels, a,e,i,) sheweth that Peter is King, James the Duke, and John the County. And if there do remain two stones, the second name Beati, shall shew you by these 3 bowels, a,e,i, that Peter is the Duke, James the King, and John the County. And so of the other, as by this Table doth plainly appear.

1,	2,	1,	2,	3,	3,	
2,	1,	3,	3,	1,	1,	
3,	3,	2,	1,	2,	1,	
a,	e,	a,	e,	i,	i,	
e	a,	i,	i,	a,	e,	
i,	i,	e,	a,	e,	a,	
1,	2,	3,	5,	6,	7,	
A,	B,	T,	M,	I,	P,	

FINIS.

IN the ensuing Tables the figures towards the left hand of the line, do shew the number of Ells, Aulns, Vares, Races, or Paulms, which are equal to the 100 Ells, Aulns, Vares, Races, or Paulms of the place named, over the head of the Table: and the figures to the right hand of the line do shew the fractions, or part, and so are all numerators of fractions, whose common denominator is 1000. So that in this decimal way of account 750 is 3 quarters of an Ell, Aulne, Vare, &c. 500 is half an Ell, 250 is a quarter, and 175 is half a quarter, &c.

Example, at Lions the 100 Aulns makes at Antwerp 163 Ells, and 934 parts of an Ell divided into a 1000 parts, take from 934, 750, which is 3 quarters, and the remain 184 which is lesse than a quarter, therefore take from it 175 which is half a quarter, and there remains 009 as much as nothing: therefore the 100 Aulns at Lions, makes at Antwerp 163 Ells, 3 quarters, and half quarter, the like of any other.

As in the ensuing Tables the Ell is divided into 1000, so the pound is divided into the like parts, and therefore 750 in the fraction is three quarters of a pound or 12 ounces, 500 is half a pound or 8 ounces, 250 is a quarter or 4 ounces, and 175 is half a quarter or 2 ounces: But the way to value these equal fractions into ounces, is by multiplying the numerator of the fraction by 16, and cut off 3 figures to the right hand, that which remains to the left hand is ounc. Example, 100 l. of Lions makes at Antwerp 90 l. 823 parts of a li. which 823 multiplied by 16 the product is 13,168, from which cut off three figures to the right hand, there remains 13 ounces: Or seek the number 823 (or the nearest to it, lest it cannot be found) and against it to the right hand you shall find 13 ounces as before, and the like of any other number.

15	937.5
14	875.0
13	812.5
12	750.0
11	687.5
10	625.0
9	562.5
8	500.0
7	437.5
6	375.0
5	312.5
4	250.0
3	187.5
2	125.0
1	62.5

The agreement of the Measures and Weights of divers Countries, the one with the other, being reduced to an equality, and drawn into Tables, as followeth.

London.

Antwerp,	166	667	Ells.
Nuremberg,	174	167	
Franckford,	208	333	
Dantzick.	138	333	
Vienna,	145	000	
Arras,	165		
Lions,	101	667	Aulne.
Paris	95	000	
Roan,	86	667	
Sibil,	135	000	Vares.
The Iles of Madeires,	103	333	
Venice,	108	000	Vares.
Lucques,	200	000	
Florence,	204	167	
Millan	230	000	
Genoa,	480	833	Paulms.

The Vares of Lisbborn is equal to the Ell of London.

Antwerp.

100 Ells at Antwerp do make at			
London,	60		Ells.
Nuremberg,	104	500	
Franckford,	125	000	
Dantzick,	83	000	
Vienna,	87	200	
Arras,	99	000	
Lions,	61	000	Aulns.
Paris,	57		
Roan,	52		
Sibil,	81		Mares.
The Iles,	62		
Venice,	108		Braces.
Lucques,	120		
Florence,	122	5	
Millan	138		
Genoa,	288	5	Paulms.

Nuremberg.

100 Ells at Nuremberg do make at

London,	57	416	Ells
Antwerp,	95	694	
Franckford,	119	617	
Dantzick,	79	414	
Vienna,	83	253	
Arras,	94	736	
Lions,	58	373	Aulns.
Paris,	54	545	
Roan,	49	760	
Sibil,	77	506	Vares,
The Iles,	59	330	
Venice	103	292	Vzaces,
Lucques,	114	832	
Florence,	117	225	
Millan,	132	057	
Genoa	276	076	Paulms.

Franckford.

100 Ells at Franckford do make at			
London,	48	000	Ells.
Antwerp,	80	000	
Nuremberg,	83	648	
Dantzick,	64	400	
Vienna,	69	600	
Arras,	79	200	
Lions,	48	8	Aulns.
Paris,	45	600	
Roan,	41	600	
Sibil,	64	8	Vares.
The Iles	40	600	
Venice,	86	4	Braces.
Lucques,	96	000	
Florence,	98	000	
Millan,	110	440	
Genoa,	239	8	Paulms.

The Ell at Leibzick and Presslau is equal unto the Ell at Franckford.

Dantzick.

Dantzick.

London,	72	289	Ells.
Antwerp,	120	482	
Nuremberg,	125	903	
Francksord,	150	602	
Vienna,	104	819	
Arras,	112	048	
Lions,	73	494	Aulns.
Paris,	68	602	
Roan,	62	650	
Sibil,	97	590	Vares.
The Iles,	74	699	
Venice,	130	120	Brazes.
Lucques,	144	578	
Florence,	147	590	
Millan,	166	265	
Genoa,	347	590	Paulms.

100 Ells at Dantzick do make

Vienna.

Vienna.

100 Ells at Vienna do make at

London,	68	965	Ells.
Antwerp,	114	942	
Nuremberg,	120	114	
Franckford,	143	678	
Dantzick,	95	402	
Arras,	113	793	
Lions,	70	011	Aulns.
Paris,	65	517	
Roan,	59	765	
Sibil,	93	103	Mares.
The Iles,	71	264	
Venice,	124	138	Braces.
Lucques,	137	930	
Florence,	140	108	
Millan,	158	620	
Genoa,	331	601	Paulm;

Arras.

Arras.

London,	60	606	Ells.
Antwerp,	101	010	
Nuremberg,	155	555	
Franckford,	126	262	
Dantzick,	83	838	
Vienna,	87	878	
Lions,	61	616	Aulns.
Paris,	57	575	
Roan,	52	525	
Sibil,	80	180	Vares.
The Iles,	62	626	
Venice,	109	090	Braces.
Lucques,	121	212	
Florence,	123	131	
Millan,	139	394	
Genoa,	291	414	Paulms.

100 Ells at Arras do make

Lions.

Lions.

100 Aulns at Lions do make	London,	98	362	Ells.
	Antwerp,	163	934	
	Nuremberg,	171	311	
	Francksord,	204	918	
	Mantzick,	136	065	
	Vienna,	142	623	
	Arras,	162	295	
	Paris,	93	443	Aulns.
	Roan,	85	246	
	Sibil,	132	791	Vares.
	The Iles	101	640	
	Venice	177	049	Vzaces.
	Lucques,	196	721	
	Florence,	208	819	
	Millan,	226	229	
	Genoa	472	950	Paulms.

The agreement of measures at Arras, with the measures at other places.

Paris

London,	105	263	Ells.
Antwerp,	175	439	
Nuremberg,	183	333	
Franckford,	219	298	
Dantzick,	145	615	
Vienna,	152	630	
Arras,	173	984	
Lions,	107	000	Aulnes.
Roan,	91	228	
Sibil,	142	105	Vares.
The Iles,	108	793	
Venice,	189	474	Brazces.
Lucques,	210	526	
Florence,	214	911	
Millan,	242	105	
Genoa,	506	136	Paulmes.

Roan

Roan.

100 Aulnes it Roan do make at			
London,	115	384	Ells.
Antwerp,	192	307	
Nurenberg,	200	961	
Franckford,	240	384	
Dantzick,	159	615	
Vienna,	167	307	
Arras	190	384	
Lions,	117	307	Aulnes
Paris,	109	615	
Sivil,	155	769	Varas
The Iles	119	230	
Venice,	207	592	Braces
Lucques,	230	768	
Florence,	235	565	
Millan,	265	384	
Genoa,	554	807	Paulmes

Sivil

Sivil.

London,	74	074	Ells.
Antwerp,	123	457	
Nuremberg,	129	012	
Franckford,	154	321	
Dantzick.	102	469	
Vienna,	107	407	
Arras,	122	222	
Lions,	75	308	Aulns.
Paris,	70	370	
Roan,	64	197	
The Iles,	76	543	Vares.
Venice,	133	333	Braces.
Lucques,	148	148	
Florence,	151	234	
Millan,	170	370	
Genoa,	356	174	Paulms

The

The Iles of Madere.

100 Weights of the Ile of Madere do make at			
London,	96	772	Ells.
Antwerp,	161	290	
Nuremberg,	168	548	
Francfort,	201	613	
Dantzick,	133	871	
Vienna,	140	322	
Arras,	159	677	
Lions,	98	387	Aulnes
Paris,	91	935	
Roan,	83	871	
Sibil,	130	645	Vares
Venice,	174	226	Vares
Lucques,	193	448	
Florence,	197	903	
Millan,	222	583	
Genoa,	465	226	Paulm

Venice.

London,	55	555	Ells.
Antwerp,	92	542	
Nuremberg,	96	790	
Francksord,	115	741	
Dantzick,	76	853	
Vienna,	80	055	
Arras,	91	696	
Lions,	56	481	Aulns.
Paris,	52	777	
Roan,	48	148	
Sibil,	75	000	Vares.
The Iles,	57	407	
Lucques,	111	111	Braces.
Florence,	113	426	
Millan,	127	777	
Genoa,	266	018	Paulms.

Lucques.

100 Braces at Lucques do make at

London,	50	Ells.
Antwerp,	63	333
Nuremberg,	87	889
Franckford,	104	166
Dantzick,	69	166
Vienna	72	500
Arras,	82	500
Lions,	50	833 Aulns.
Paris,	47	500
Roan,	43	333
Sibil,	67	500 Vares.
The Iles,	51	666
Venice,	90	000 Braces.
Florence,	102	083
Millan,	115	000
Genoa,	240	416 Paulms.

Florence.

London,	48	979	Ells.
Antwerp,	81	632	
Nuremberg,	85	306	
Francksord,	102	040	
Dantzick,	67	755	
Vienna,	71	020	
Arras,	80	808	
Lions,	49	796	Aulne.
Paris,	46	530	
Roan,	42	449	
Sibil,	66	122	Vares.
The Iles,	50	612	
Venice,	88	163	Braces.
Lucques,	97	859	
Millan,	112	653	
Genoa,	235	510	Palms.

100 Braces s at Florence do make at

Millan.

100 Braces at Millan do make at				
London,	43	478	Ells.	
Antwerp,	72	463		
Nuremberg,	75	724		
Francksord,	90	579		
Dantzick,	60	145		
Vienna	63	043		
Arras,	70	174		
Lions,	44	202	Aulns.	
Paris,	41	217		
Roan,	37	680		
Sibil,	58	695	Vares.	
The Iles,	44	926		
Venice,	78	260	Braces.	
Lucques,	86	956		
Florence,	88	768		
Genoa,	209	058	Paulms	

The agreement of weights of divers Countries the one with the other, being reduced to an equality, and drawn into Tables, as followeth.

London.

112 pound weight at London do make at

Antwerp,	107	625
Lisbone,	99	000
Nuremberg,	100	500
Roan,	98	000
Lions,	118	500
Paris,	102	250
Diep,	100	250
Geneva,	90	375
Toulouse,	122	750
Rochell,	124	875
Marseilles,	124	250
Sibil,	109	750
Venice suf.	166	875
Venice grof.	105	375
Vienna,	89	375
Pezelaw,	134	625
Leibzick,	101	250
Dantzick,	129	250
Lubeck,	97	375
Barcellone,	143	500
Genoa,	157	250

Antwerp.

100 lib. at Antwerp makes at

London,	104	065
Lisbhoan	91	986
Nuremberg,	93	371
Roan,	91	057
Lions,	110	104
Paris,	94	006
Diep,	93	147
Geneva,	83	972
Toulouse,	114	053
Rochel,	116	028
Marseilles,	115	447
Sibil,	101	974
Venice lut.	155	052
Venice graf.	97	909
Vienna,	83	043
Praslaw,	125	087
Leibzick,	94	076
Dantzick,	120	093
Lubeck,	90	476
Barcellone,	133	333
Genoa,	146	109

Franckford.

Franckford.

100 lib. at Lisbon makes at	London,	113	131
	Antwerp,	108	713
	Nuremberg,	101	262
	Roan,	98	989
	Lions,	119	696
	Paris,	103	282
	Diep,	101	263
	Geneva,	91	288
	Toulouse.	123	998
	Rochell,	126	136
	Marsellies,	125	505
	Sibil,	110	858
	Venice sut.	168	561
	Venice gros.	106	439
	Vienna,	90	277
	Breslaw,	135	985
	Leibzick,	102	272
	Dan zck,	130	555
	Lubeck,	98	358
	Barcellone,	144	949
	Genoa,	158	838

The 100 weight at Franckford is equal unto the 100 weight at Lisbborn.

Nuremberg.

100 lib. at Nuremberg makes at

London,	111	442
Antwerp,	107	089
Lisbon,	98	508
Roan,	97	512
Lions,	117	910
Paris,	101	711
Diep,	99	751
Geneva,	89	927
Toulouse,	122	139
Rochel,	124	254
Marseilles,	123	632
Sibil,	109	204
Venice lut.	166	445
Venice gros.	104	850
Vienna,	88	930
Breslaw,	133	955
Leibzick,	100	746
Dantzick,	128	607
Lubeck,	96	890
Barcellone,	142	786
Genoa,	156	467

Roan

Roan.

100 lib. at Roan makes at	London,	114	285
	Antwerp,	109	821
	Lisbon,	101	020
	Nuremberg,	102	551
	Lions,	120	918
	Paris,	104	336
	Diep,	102	296
	Geneva,	92	219
	Toulouse,	125	255
	Rochel,	127	423
	Marseilles,	126	796
	Sibil,	111	990
	Venice sut.	117	708
	Venice gros.	170	525
	Vienna,	91	199
	Pzeslaw	137	347
	Leibzick,	103	316
	Dantzick,	131	898
	Lubeck,	99	362
	Barcellone,	146	530
	Genoa,	160	459

Lions.

London,	95	063
Antwerp,	90	823
Lisbon,	83	544
Nuremberg,	84	810
Roan,	82	700
Paris,	86	287
Diep,	84	599
Geneva,	76	265
Toulouse,	103	589
Rochel,	105	380
Marseilles,	103	850
Sibil,	92	616
Venice sut.	140	823
Venice grot.	88	928
Vienna,	75	422
Pressaw,	113	607
Leibzick,	85	443
Dantzick,	109	072
Lubeck,	82	173
Barcellone,	121	097
Genoa,	132	700

100 lib. at Lions makes at Paris.

Paris.

100 lib. at Paris makes at	London,	109	535
	Antwerp,	105	256
	Lisbon,	96	821
	Nuremberg,	98	329
	Roan,	95	843
	Lions,	115	892
	Diep,	98	044
	Geneva,	88	386
	Toulouse,	120	049
	Rochel,	122	146
	Marseilles,	121	515
	Sibil,	107	334
	Venice sut.	163	203
	Venice grof.	103	056
	Vienna,	87	408
	Pressaw	131	663
	Leibzick,	99	022
	Dantzick,	126	406
	Lubeck,	95	232
	Barcelone,	140	342
	Genua,	153	789

The 100 weight at Collen and Ausburge, is equal unto the 100 weight at Paris.

Diep

Diep.

100 lib. at Diep makes at	London,	111	720
	Antwerp,	107	357
	Lisbona,	98	753
	Nuremberg,	100	249
	Roan,	97	755
	Lions,	118	204
	Paris,	101	995
	Geneva,	90	149
	Toulouse,	122	443
	Rochel,	124	563
	Marseilles,	123	940
	Sibil,	109	476
	Venice sut.	166	458
	Venice grol.	105	112
	Vienna,	89	152
	Pressaw,	134	288
	Leibzick,	100	697
	Dantzick,	128	027
	Lubeck,	97	132
	Barcellone,	143	042
	Genoa,	156	857

Geneva.

London,	123	928
Antwerp,	119	087
Lisbon,	109	543
Nuremberg,	111	022
Roan,	108	437
Lions,	131	123
Paris,	113	138
Diep,	110	926
Toulouse,	135	823
Rochel,	138	174
Marseilles,	137	482
Sibil,	121	438
Venice sut.	184	637
Venice grof.	116	597
Vienna,	98	893
Pressaw,	148	962
Leibzick,	112	028
Dantzick	143	015
Lubeck,	107	745
Barcellone,	158	782
Genoa,	173	997

Toulouse,

Toulouse.

100 lib. at Toulouse makes at

London,	91	25
Antwerp,	87	67
Francksord,	80	65
Nurenberg,	81	87
Koan,	79	87
Lions,	96	53
Paris,	83	29
Diep,	81	67
Geneva,	73	62
Rochel,	101	73
Marseilles,	101	00
Sibil,	89	40
Venice sut.	135	94
Venice grof.	85	84
Vienna,	72	81
Pzellaw,	109	67
Leibzich,	82	48
Dantzich,	105	29
Lubeck,	79	02
Barcellone,	116	90
Genoa,	128	10

Loch

Rochel.

	London,	89	689
	Antwerp,	86	187
	Lisbon,	79	279
	Nuremberg,	80	480
	Roan,	78	478
	Lions,	94	895
	Paris,	81	882
	Diep,	80	280
00 pound	Geneva,	72	373
Rochel	Toulouse,	98	298
ales at	Marseilles,	99	499
	Sibil,	87	888
	Venice sut.	133	638
	Venice grol.	84	380
	Vienna,	71	571
	Pressaw,	07	807
	Leibzick,	181	081
	Dantzick	103	503
	Lubeck,	77	978
	Barcelone,	114	914
	Genoa,	125	925

Marseilles.

Marſeilles.

100 lib. at Marſeilles makes a

London,	90	140
Antwerp,	86	627
Lisbon,	79	678
Nuremberg,	80	885
Roan,	78	873
Lions,	95	372
Paris,	82	293
Diep,	80	684
Geneva,	78	068
Toulouſe,	98	712
Rochel,	100	502
Sibil,	88	322
Venice ſut.	134	386
Venice groſ.	84	809
Vienna,	71	931
Breſlaw,	108	350
Leibzick,	81	489
Dantzick,	104	024
Lubeck,	78	370
Barcellone,	115	493
Genoa,	126	558

Sivil.

London,	102	050
Antwerp,	98	063
Lisbon,	90	205
Nuremberg,	91	571
Roan,	89	262
Lions,	107	972
Paris,	93	166
Diep,	91	161
Geneva,	82	348
Toulouse,	111	845
Rochel,	113	781
Marsellies,	113	212
Venice lut.	152	050
Venice grot.	96	014
Vienna,	81	435
Breslaw,	122	665
Leibzick,	92	255
Dantzick,	117	767
Lubeck,	88	724
Barcellone,	130	751
Genoa,	143	325

100 lib. at Sibil makes at

Venice ſuttle VVeight.

100 lib. at Venice ſuttle weight makes at	London,	67	115
	Antwerp,	64	494
	Liſbon,	59	25
	Nuremberg,	60	224
	Roan,	58	726
	Lions,	71	011
	Paris,	61	274
	Diep,	60	074
	Geneva,	54	157
	Toulouſe,	73	559
	Rochel,	74	831
	Marſeilles,	74	457
	Sibil,	65	768
	Venice groſ.	63	146
	Vienna,	53	558
	Breſlaw,	80	674
	Leibzick,	60	674
	Dantzick,	77	453
	Lubeck,	52	299
	Barcellone,	85	992
	Genoa,	94	232

Venice-

Venice groſs Weight.

100 lib. at Venice groſs weight makes at

London,	106	287
Antwerp,	102	135
Lisbon,	93	950
Nuremberg	95	373
Roan,	93	001
Lions,	112	467
Paris,	97	034
Diep,	95	136
Geneba,	85	765
Toulouſe,	116	489
Rochel,	118	595
Marſeilles,	117	912
Sibil,	104	151
Venice ſut.	158	363
Vienna,	84	816
Breſlaw,	127	758
Leibzick,	96	087
Dantzick,	122	742
Lubeck,	92	408
Barcellona,	126	275
Genoa,	149	229

Vienna.

lib. at Vienna makes at

London,	125	315
Antwerp,	120	420
Lisbon,	110	769
Nurenberg,	112	447
Roan,	109	650
Lions,	132	598
Paris,	114	405
Diep,	112	168
Geneba,	101	118
Toulouse,	137	343
Rochel,	139	720
Marseilles,	139	021
Sibil,	122	797
Venice sut.	186	712
Venice grof.	117	902
Wratlaw	150	629
Leibzick,	113	286
Dantzick,	144	615
Lubeck	108	951
Barcellone,	160	55
Genoa,	175	943

Preslaw

Preslaw.

100 pound at Preslaw makes at

London,	83	195
Antwerp,	79	944
Lisbon,	73	537
Nuremberg,	74	652
Roan,	72	795
Lions,	88	022
Paris,	95	951
Diep,	74	466
Geneva,	67	131
Toulouse.	91	179
Rochel,	92	757
Marseilles,	92	220
Sibil,	81	522
Venice sut.	123	955
Venice grol.	78	273
Vienna,	66	387
Leibzick,	75	009
Dantzick,	96	087
Lubeck,	72	330
Barcellone,	106	592
Genoa,	116	805

Leibzick.

100 pound at Leibzick makes at

London,	110	617
Antwerp,	106	296
Lisbona,	97	788
Nuremberg,	99	259
Roan,	96	790
Lions,	116	938
Paris,	100	987
Diep,	99	012
Geneva,	89	259
Toulouse,	121	234
Rochel,	123	333
Marseilles,	122	716
Sibil,	108	395
Venice sut.	164	814
Venice gros.	104	074
Vienna,	88	272
Pzellaw,	132	963
Dantzick,	127	654
Lubeck,	96	172
Barcellone,	141	827
Genoa,	155	308

Dantzick

Dantzick.

100 lib. at Dantzick makes at

London,	86	653
Antwerp,	83	268
Lisbon,	76	595
Nuremberg,	77	756
Roan,	75	822
Lions,	91	683
Paris,	79	110
Diep,	77	563
Geneva,	69	922
Toulouse,	94	671
Rochel,	96	615
Marseilles,	96	131
Sibil,	84	913
Venice lut.	129	110
Venice grof.	81	520
Vienna,	69	148
Wratislaw,	104	158
Leibzick,	78	336
Lubeck	75	337
Barcellona,	111	025
Genoa,	121	663

Lubeck.

100 pound at Lubeck makes at

London,	115	019
Antwerp,	110	526
Lisbon,	101	667
Nuremberg,	103	209
Roan,	100	642
Lions,	121	694
Paris,	105	006
Diep,	102	952
Geneba,	92	811
Toulouse,	126	059
Rochel,	128	241
Marseilles,	127	609
Sibil,	112	708
Venice sut.	171	373
Venice gros.	108	215
Vienna,	91	784
Pzeslaw,	138	254
Leibzick,	103	979
Dantzick,	132	734
Barcellone,	147	368
Genoa,	161	489

Barcellone

Barcellone.

100 lib. at Barcellone makes at

London,	78	048
Antwerp,	75	000
Lisbon	68	989
Nuremberg	70	061
Roan,	68	290
Lions,	82	578
Paris,	71	254
Diep,	69	860
Geneve,	62	979
Toulouse,	85	540
Rochel,	87	021
Marseilles,	86	585
Sibil,	76	480
Venice sut.	116	149
Venice grols,	73	432
Vienna,	62	282
Breslaw,	93	118
Leibzick,	70	557
Dantzick,	90	061
Lubeck,	67	857
Genoa,	109	581

Genoa.

100 lib. at Genoa makes at

London,	71	224
Antwerp,	68	442
Lisbon,	62	957
Nuremberg,	63	910
Roan,	62	320
Lions,	75	357
Paris,	65	023
Diep,	63	752
Geneva,	57	478
Toulouse,	78	060
Rochel,	79	411
Marseilles,	79	014
Sibil,	69	793
Venice sut.	106	121
Venice gros.	67	011
Vienna,	56	836
Pzeslaw	85	612
Leibzick,	64	388
Dantzick,	82	194
Lubeck	61	923
Barcellone,	91	272

The 100 weight at Aquila, is equal to the 100 weight at Genoa.

Here

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FINIS.

An Advertisement touching this Edition.

THE friendly Reader may please to take notice that in this Impression of 1659, the whole Book hath been revised, every Question therein examined, the Faults that were committed in former Impressions, Corrected, the whole restored to its first integrity. The Tables of Weights and Measures at the end of the Book according to the Authors supposition, that is, as they are all compared with the Weights and Measures of *London*, with much labour examined: The Fractions which before were in the common way (and so the figure being small in many not discerned) are put into the decimal parts, and so the same with the integral, but farre more true than the common Fractions can express it in one figure, and if in the common it be expresst in many, (as it must be, if true) then the decimal is far more easie, because the Denominator is one and the same to all, whereas the other is differing.

I shall not need to adde any thing in praise of the Book, the many Impressions that have been made thereof [illegible] save me that labour; the task I undertook [illegible] what was amiss, which I have [illegible] faithfulness, and so commend it to thy friendly acceptance. Farewell.